REPORTABLE INFECTIOUS DISEASE IN KANSAS

2013 SUMMARY

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INTRODUCTION

PURPOSE AND FORMAT OF THIS REPORT

This is the eighteenth annual summary of reportable diseases published by the Kansas Department of Health and Environment (KDHE).The purpose of this report is to provide useful information for health care providers, public health colleagues, and policy makers about infectious diseases in Kansas. The focus of the report is the assessment of disease trends, including incidence, severity, populations affected, and risk factors for infection.

The following reportable diseases are not included in this summary: Acquired Immune Deficiency Syndrome (AIDS), chancroid, chlamydia, gonorrhea, Human Immunodeficiency Virus (HIV), tuberculosis, and syphilis. Statistical information for these diseases can be found at KDHE's Bureau of Disease Control and Prevention website at http://www.kdheks.gov/bdcp/index.html.

Some reportable diseases were not detected during 2013; information is presented for those diseases that were reported. Cases must meet the surveillance definition for a confirmed or probable case and have been reported to KDHE before May 1, 2014 to be included in this document.

Incidence rates have been calculated from the vintage 2013 population estimates provided by the U.S. Census Bureau. Whenever possible, information about disease trends for the United States has been included for comparison with Kansas' trends. Due to confidentiality concerns, limited demographic information is presented if fewer than five total cases of a disease were reported.

Race data is collected for most diseases using the following categories: American Indian/Alaska Native, Asian/Pacific Islander, Black/African-American, and White. If an individual reports more than one race category, the race is classified as "Other". Currently, incidence calculations are not performed for the other race category. Ethnicity data is reported as either Hispanic or non-Hispanic. Disease incidence of urban and non-urban counties has been included. Urban counties are defined as having a population density of greater than 150 people per square mile. Kansas' six urban counties account for more than half of the state population: Johnson, Wyandotte, Sedgwick, Shawnee, Douglas, and Leavenworth. The remaining 99 counties in the state are aggregated into the "non-urban" category.

The report is divided into three sections. Section I presents summaries of infectious, reportable diseases or conditions of public health importance. Each of the disease summaries includes a brief overview of the disease and selected analysis of the disease in Kansas. Section II includes special studies and reports. Section III includes reference documents and supplementary tables.

DISEASE REPORTING IN KANSAS

Health care providers, laboratories, and hospitals are required by Kansas law (K.S.A. 65-118, 65-128; 65-6001 through 65-6007; K.A.R. 28-1-2, 28-1-4, and 28-1-18) to report selected diseases and conditions. Reports of infectious diseases are initially sent to KDHE's Bureau of Epidemiology and Public Health Informatics, where they are reviewed and forwarded to local health departments. The local health departments are responsible for any required investigation and for instituting basic public health interventions.

Case reports are stored in Kansas' electronic disease surveillance system (also known as EpiTrax). EpiTrax is a central, statewide database of reportable and selected non-reportable diseases and conditions. It can be accessed via the internet by authorized public health officials. To protect restricted, confidential, health and clinical data of individuals, internal security structures are in place. EpiTrax allows users to report disease occurrences rapidly and efficiently; user may also generate summary statistics and reports to assist in evaluating public health efforts. Kansas' disease incidence numbers are transmitted from EpiTrax to the Centers for Disease Control and Prevention (CDC) every week for inclusion in *Morbidity and Mortality Weekly Report* (*MMWR*), a series of publications produced by the CDC's Epidemiology Program Office.

In collaboration with the Council of State and Territorial Epidemiologists (CSTE), CDC publishes case definitions for public health surveillance - the CDC/CSTE surveillance case definitions combine clinical, laboratory, and epidemiologic criteria. By providing uniform criteria for disease reporting, case definitions allow greater specificity and comparability of diseases reported from different geographic regions. The CDC/CSTE case definitions can be found at http://wwwn.cdc.gov/nndss/conditions/notifiable/2013/infectious-diseases/.

The usefulness of public health surveillance data depends on its uniformity, simplicity, and timeliness. The case definitions in this report follow the CDC/CSTE surveillance definitions for disease reporting and should not be confused with clinical diagnoses. The use of additional clinical, epidemiologic, and laboratory data may enable a physician to diagnose a disease even though the formal standardized surveillance case definition may not be met.

INTERPRETATION OF THE DATA

When interpreting the data in this report, it is important to remember that the completeness of disease reporting is variable. For example, nationwide reporting of salmonellosis is estimated to be 2% complete; the actual number of persons infected with the disease is likely much higher than the number who sought medical care and were in turn reported to public health. When interpreting data, absolute numbers are less meaningful than trends; however, trends can be influenced by changes in case definitions, reporting patterns, and by random fluctuations. It is also important to note that small numbers affect rates and interpretation of rates. Small case numbers can produce artificially high disease rates and unstable, widely fluctuating disease trends.

In addition, prior to 2012, only cases classified as "confirmed" were included in disease counts and rates for *Reportable Infectious Diseases in Kansas*. Beginning in 2012, in accordance with how case counts are transmitted to CDC for publication in the MMWR, both confirmed and probable case counts are included for many diseases presented in the summary. Because of this change, 2012 and 2013 counts and rates may be higher compared with previous years' data. The case report counts that now include confirmed and probable cases are anthrax; arboviral disease; brucellosis; campylobacteriosis; cryptosporidiosis; cyclosporiasis; dengue hemorrhagic fever; diphtheria; ehrlichiosis/ anaplasmosis; giardiasis; *Haemophilus influenzae*, invasive disease (including Hib); hemolytic-uremic syndrome, post-diarrheal (HUS); Lyme disease; meningococcal disease; mumps; pertussis; plague; psittacosis; Q fever, acute and chronic; salmonellosis; severe acute respiratory syndrome (SARS); Shiga toxin-producing *Escherichia coli* (STEC); shigellosis; spotted fever rickettsiosis; tetanus; toxic-shock syndrome (staphylococcal and streptococcal); tularemia; typhoid fever; varicella; and yellow fever.

2013 NOTABLE DISEASE EVENTS

Staphylococcal Food Poisoning: Twenty-six cases of gastroenteritis were associated with consuming food purchased at a Shawnee county restaurant in April, 2013. Although no clinical specimens were collected, the clinical data reported among cases was consistent with staphylococcal food intoxication. Food samples collected tested positive for staphylococcal enterotoxin. Temperature abuse was observed during preparation of food items during inspections at the restaurant.

Cryptosporidiosis: Six cases of cryptosporidiosis were identified of individuals who responded to a tractor-trailer rollover which was carrying Holstein calves in April, 2013. City police officers and county sheriff's deputies responded to the accident, contacting towing company employees and civilian volunteers to assist righting the truck and securing the cattle. Most of the calves were reportedly experiencing diarrheal symptoms at the time. Individuals who reported coming into contact with the calves, either through carrying injured calves or coming into contact with fecal matter, had significantly higher likelihood of becoming ill when compared to individuals with no contact.

Varicella: An outbreak of 111 cases occurred within a community with a low vaccination rate. Initially, six cases were identified in one household with additional cases identified in a church attended by the household. Rash onsets among cases ranged from March to July 2013. A majority of cases resided in Pottawatomie County (66%) with remaining cases distributed between three neighboring counties (Wabaunsee, Shawnee, and Jackson). Of the 111 cases identified, 103 (93%) were either unvaccinated or had unknown vaccination status.

Bloodborne Pathogens: In July, a regional hospital notified KDHE of a possible infection prevention breach in colonoscope reprocessing. Patients undergoing colonoscopies during this time period were notified by the hospital and an investigation into the potential bloodborne pathogen (BBP) transmission was initiated. Investigation found that 277 individuals received colonoscopies between January and July, 2013. BBP testing was completed on 248 individuals. There was no evidence that BBP transmission occurred as a result of this infection prevention breach.

Norovirus: An outbreak of gastrointestinal illness associated with a restaurant was identified in Finney County. Of the 402 individuals interviewed, 296 reported illness and 216 met case definition. Food history was collected for each person interviewed to determine association with illness. Lettuce, tomato, and hot peppers were associated with illness with tomato and hot peppers remaining significantly associated with illness after conditional logistic regression. The outbreak was likely to have been caused by an ill food handler.

Salmonella: Kansas was notified that four Kansas residents with cases of salmonellosis were associated to a multi-state cluster suspected to be caused by exposure to live baby poultry. Nationally, 356 cases of salmonellosis in 39 states were identified as part of this outbreak, including 19 cases from Kansas. Among the 17 individuals for whom information was available, 12 (71%) reported contact with live poultry with 9 (75%) reported purchase of live poultry from an agricultural feed store. Two additional ill persons who did not report direct contact with live poultry did report either visiting a petting zoo or an agricultural feed store.

SECTION I: DISEASE SUMMARIES

AMEBIASIS

CLINICAL FEATURES: There are two forms of amebiasis: intestinal and extraintestinal. The intestinal form of the disease is usually asymptomatic, ranging from acute mild abdominal discomfort to chronic diarrhea and fulminating dysentery. Fever, chills, and bloody mucoid diarrhea may also be present. Diarrheal episodes may alternate with periods of constipation or remission. The extraintestinal form appears in severe cases, often characterized by amebic liver abscesses. Infection also may be asymptomatic.

CAUSATIVE AGENT: The protozoan parasite *Entamoeba histolytica*.

MODE OF TRANSMISSION: *E. histolytica* predominantly infects humans and other primates. Transmission among humans most often occurs through ingestion of chlorine-resistant amebic cysts present in fecally contaminated water or food. Oral-anal sexual contact is also a risk factor for infection.

INCUBATION PERIOD: Onset of symptoms usually occurs 2 to 4 weeks after infection, but this may be variable.

PERIOD OF COMMUNICABILITY: Infection may occur as long as cysts are present in stool, which may continue for years.

PUBLIC HEALTH SIGNIFICANCE: Amebiasis is of public health concern due to the prolonged shedding period and the severe complications that may develop, usually involving the liver. Immunocompromised persons are also at increased risk of developing the severe form of disease. Treatment is available for both intestinal and extraintestinal amebiasis.

REPORTABLE DISEASE IN KANSAS SINCE: 1982.

CLINICAL CRITERIA FOR SURVEILLANCE PURPOSES

- Infection of the large intestine by *Entamoeba histolytica* may result in an illness of variable severity ranging from mild, chronic diarrhea to fulminant dysentery. Extraintestinal infection also can occur (e.g., hepatic abscess).

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

- Intestinal amebiasis

  - Demonstration of cysts or trophozoites of *E. histolytica* in stool or
  - Demonstration of trophozoites in tissue biopsy or ulcer scrapings by culture or histopathology

- Extraintestinal amebiasis

  - Demonstration of *E. histolytica* trophozoites in extraintestinal tissue

SURVEILLANCE CASE DEFINITIONS

- *Confirmed, intestinal amebiasis*: a clinically compatible illness that is laboratory confirmed. Asymptomatic intestinal carriage of *E. histolytica* should not be reported.

- *Confirmed, extraintestinal amebiasis*: a parasitologically confirmed infection of extraintestinal tissue, or among symptomatic persons (with clinical or radiographic findings consistent with extraintestinal infection), demonstration of specific antibody against *E. histolytica* as measured by indirect hemagglutination or other reliable immunodiagnostic test (e.g., enzyme-linked immunosorbent assay). Among asymptomatic persons, a positive serologic test does not necessarily indicate extraintestinal amebiasis.

EPIDEMIOLOGY AND TRENDS

Four confirmed cases of intestinal amebiasis were reported during 2013. The three-year median for 2010-2012 was two cases. Infections are not tracked nationally – no comparable U.S. rate is available.

Confirmed Cases: 4

Kansas incidence per 100,000 population (2013): 0.14
U.S. incidence per 100,000 population (2013): *N/A*

ARBOVIRAL DISEASE

(Includes West Nile, Western equine, California serogroup, Eastern equine, Powassan, and St. Louis arboviruses)

CLINICAL FEATURES: Arboviral infections may be asymptomatic or may result in illness of variable severity, sometimes associated with central nervous system (CNS) involvement. When the CNS is affected, clinical syndromes ranging from febrile headache to aseptic meningitis to encephalitis may occur. West Nile virus (WNV) presents clinical features similar to other causative agents of meningitis and encephalitis.

CAUSATIVE AGENT: Arboviruses, including West Nile, Western equine, Eastern equine, Powassan, and St. Louis arboviruses.

MODE OF TRANSMISSION: Arboviruses are transmitted by the bite of an infected mosquito. Natural transmission involves a mosquito-bird-mosquito cycle; animals such as humans and horses do not circulate enough virus to re-infect a blood-feeding mosquito, and thus are referred to as "dead-end" or "accidental" hosts. Mosquito species responsible for transmission vary by region.

INCUBATION PERIOD: Varies. For West Nile virus, the incubation period ranges from 3 to 15 days (usually 6 days).

PERIOD OF COMMUNICABILITY: Human-to-human transmission is exceptionally rare, but has occurred among blood and organ recipients.

PUBLIC HEALTH SIGNIFICANCE: The role of public health is limited to surveillance and education. Prevention is accomplished through adopting personal behaviors to prevent being bitten by mosquitoes, and through destroying mosquito breeding sites.

REPORTABLE DISEASE IN KANSAS SINCE: 2002

CLINICAL CRITERIA FOR SURVEILLANCE PURPOSES

Neuroinvasive disease

- Fever (≥100.4°F or 38°C) as reported by the patient or a health-care provider, ***AND***
- Meningitis, encephalitis, acute flaccid paralysis, or other acute signs of central or peripheral neurologic dysfunction, as documented by a physician, ***AND***
- Absence of a more likely clinical explanation.

Non-neuroinvasive disease

- Fever (≥100.4°F or 38°C) as reported by the patient or a health-care provider, ***AND***
- Absence of neuroinvasive disease, ***AND***
- Absence of a more likely clinical explanation.

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

- Isolation of virus from, or demonstration of specific viral antigen or nucleic acid in, tissue, blood, CSF, or other body fluid, ***OR***
- Four-fold or greater change in virus-specific quantitative antibody titers in paired sera, ***OR***
- Virus-specific IgM antibodies in serum with confirmatory virus-specific neutralizing antibodies in the same or a later specimen, ***OR***
- Virus-specific IgM antibodies in CSF and a negative result for other IgM antibodies in CSF for arboviruses endemic to the region where exposure occurred, ***OR***
- Virus-specific IgM antibodies in CSF or serum.

SURVEILLANCE CASE DEFINITIONS

- *Confirmed:*

    Neuroinvasive disease

    A case that meets the above clinical criteria for neuroinvasive disease and one or more the following laboratory criteria for a confirmed case:

    - Isolation of virus from, or demonstration of specific viral antigen or nucleic acid in, tissue, blood, CSF, or other body fluid, ***OR***
    - Four-fold or greater change in virus-specific quantitative antibody titers in paired sera, ***OR***
    - Virus-specific IgM antibodies in serum with confirmatory virus-specific neutralizing antibodies in the same or a later specimen, ***OR***
    - Virus-specific IgM antibodies in CSF and a negative result for other IgM antibodies in CSF for arboviruses endemic to the region where exposure occurred.

    Non-neuroinvasive disease

    A case that meets the above clinical criteria for non-neuroinvasive disease and one or more of the following laboratory criteria for a confirmed case:

    - Isolation of virus from, or demonstration of specific viral antigen or nucleic acid in, tissue, blood, CSF, or other body fluid, ***OR***
    - Four-fold or greater change in virus-specific quantitative antibody titers in paired sera, ***OR***
    - Virus-specific IgM antibodies in serum with confirmatory virus-specific neutralizing antibodies in the same or a later specimen, ***OR***
    - Virus-specific IgM antibodies in CSF and a negative result for other IgM antibodies in CSF for arboviruses endemic to the region where exposure occurred.

- *Probable:*

  Neuroinvasive disease

  A case that meets the above clinical criteria for neuroinvasive disease and the following laboratory criteria:

  - Virus-specific IgM antibodies in CSF or serum but with no other testing.

  Non-neuroinvasive disease

  A case that meets the above clinical criteria for non-neuroinvasive disease and the laboratory criteria for a probable case:

  - Virus-specific IgM antibodies in CSF or serum but with no other testing.

EPIDEMIOLOGY AND TRENDS

In 2013, there were 33 probable cases of neuroinvasive West Nile virus (WNV) and 5 confirmed and 54 probable cases of non-neuroinvasive WNV. The median age was 60 years (range 12 – 85 years). Fifty-six cases (61%) were hospitalized. There were eight (9%) deaths.

The earliest cases were reported in July (n=3). The majority (73%, n=67) of cases occurred in September, followed by August (n = 13), and October (n = 9).

This was the highest number of cases reported in Kansas since 2003.

Confirmed and Probable Cases: 92

Kansas incidence per 100,000 population (2013): 3.18
U.S. incidence per 100,000 population (2013): 0.82

MOSQUITO SURVEILLANCE

During 2013, the Kansas Biological Survey partnered with the Sedgwick County Health Department and the Kansas Department of Health and Environment to conducted mosquito surveillance in Sedgwick County. Mosquito surveillance was conducted from May through September and potential vector mosquitoes were tested for West Nile virus at the Kansas Health and Environmental Laboratories. A total of 286 mosquito pools were tested for West Nile virus: 10.5% (30) tested positive. The first WNV-positive pol was collected on July 30th. No cases of St. Louis or La Crosse encephalitis virus were reported in humans or found in mosquitoes during 2013.

BOTULISM

CLINICAL FEATURES: Ingestion of the botulinum toxin from *Clostridium botulinum* bacteria results in abrupt onset of an illness of variable severity. Cranial nerve palsies and symmetric, descending, flaccid paralysis are the two most common symptoms of botulism. Other commonly reported symptoms of foodborne botulism include double or blurred vision, dry mouth, and difficulties swallowing or speaking. In infants, ingestion of *C. botulinum* spores results in constipation, decreased movement, poor feeding, altered cry, generalized weakness, and reduced muscle tone. Illness may also occur when spore infect a wound; symptoms are similar to foodborne botulism.

CAUSATIVE AGENT: *Clostridium botulinum*, a gram-positive bacterium.

MODE OF TRANSMISSION: Ingestion of food contaminated with botulinum toxin or spores, or contamination of a wound with *C. botulinum* spores.

INCUBATION PERIOD: Foodborne botulism may range from 6 hours to 8 days (average, 12 to 48 hours). Infant botulism ranges from 3 to 30 days from initial exposure to spores. Wound botulism may range from 4 to 14 days from the introduction of spores into the wound.

PERIOD OF COMMUNICABILITY: Person-to-person spread has not been documented.

PUBLIC HEALTH SIGNIFICANCE: *C. botulinum* spores are commonly found in soil, agricultural products such as honey, and home-canned foods. Prevention of botulism focuses on education regarding appropriate food preparation and canning practices as well as education of parents and care providers regarding the danger of feeding raw honey to infants.

REPORTABLE DISEASE IN KANSAS SINCE: 1982

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

- Detection of botulinum toxin in serum, stool, or patient's food, ***OR***
- Isolation of *Clostridium botulinum* from stool

SURVEILLANCE CASE DEFINITIONS

- *Confirmed:*

  Foodborne

  - a clinically compatible case that is laboratory confirmed or that occurs among persons who ate the same food as persons who have laboratory-confirmed botulism

  Infant

- a clinically compatible case that is laboratory-confirmed, occurring in a child aged less than 1 year

Wound

- a clinically compatible case that is laboratory confirmed in a patient who has no suspected exposure to contaminated food and who has a history of a fresh, contaminated wound during the 2 weeks before onset of symptoms, or a history of injection drug use within the 2 weeks before onset of symptoms

EPIDEMIOLOGY AND TRENDS

In 2013, one confirmed case of infant botulism was reported in Kansas. The case was hospitalized, treated, recovered, and was released. Among the six confirmed cases of botulism reported since 2002; only one was isolated from a wound. The remaining were cases of infant botulism.

Confirmed Cases: 1

Kansas incidence per 100,000 population (2013):	0.03
U.S. incidence per 100,000 population (2013):	0.05

CAMPYLOBACTERIOSIS

CLINICAL FEATURES: An illness characterized by diarrhea, abdominal pain, malaise, fever, nausea, and vomiting. Stools may contain visible or occult blood. Clinical manifestations from *Campylobacter* can range from mild infections lasting 1 to 2 days to severe persistent infections. Occasionally, long-term consequences may result from infection, including Guillain-Barre′ syndrome (GBS), a rare disease that affects the nervous system.

CAUSATIVE AGENT: *Campylobacter* spp., a gram-negative bacterium, most commonly *Campylobacter jejuni*.

MODE OF TRANSMISSION: Occurs after ingestion of contaminated liquids (particularly untreated water or unpasteurized milk and juices) or food (undercooked chicken or pork). Direct contact with fecal material from infected animals and person-to-person contact are less frequent causes of infection. Reservoirs include animals, most commonly poultry and cattle. Puppies, kittens, other pets, swine, sheep, rodents, and birds may also be sources of human infection. Chronic infection of poultry and other animals constitutes the primary source of infection.

INCUBATION PERIOD: 1 to 10 days (average 2 to 5 days)

PERIOD OF COMMUNICABILITY: Throughout the course of infection; usually from several days to several weeks; can last from 2 to 7 weeks if not treated with antibiotics.

PUBLIC HEALTH SIGNIFICANCE: *Campylobacter* spp. are an important cause of diarrheal illness in all parts of the world and in all age groups. Common source outbreaks have occurred, most often associated with foods, especially undercooked chicken, unpasteurized milk, and non-chlorinated water.

REPORTABLE DISEASE IN KANSAS SINCE: 1990

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

- Isolation of *Campylobacter* from any clinical specimen.

SURVEILLANCE CASE DEFINITIONS

- *Confirmed:* A case that is laboratory confirmed.
- *Probable:* A clinically compatible case that is epidemiologically linked to a confirmed case

EPIDEMIOLOGY AND TRENDS

In 2013, 328 confirmed cases of campylobacteriosis were reported in Kansas. The three-year median for 2010-2012 was 300 cases. Infections are not tracked nationally—no comparable U.S. rate is available.

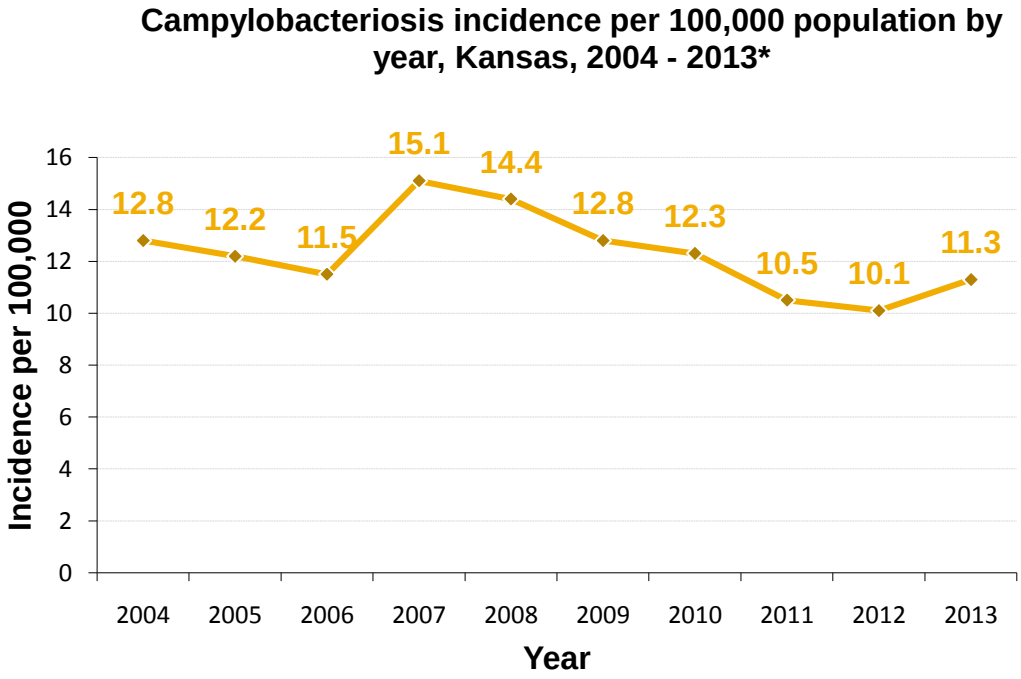
Confirmed and probable cases ranged in age from less than one year to 92 years. The median age was 35 years. The highest incidence rate occurred in those under 5 years of age (14.0 per 100,000).

Residents of nonurban counties accounted for 211 (64%) of the confirmed and probable cases.

Information for cases were available on the consumption of raw milk (237 cases with available data), unpasteurized cheese (231 cases with available data), and other non-pasteurized milk products (232 cases with available data). Among the respondents, 5 (2.1%) reported consuming unpasteurized milk, 5 (2.2%) reported consuming unpasteurized cheese, and 2 (0.9%) reported consuming other unpasteurized milk products.

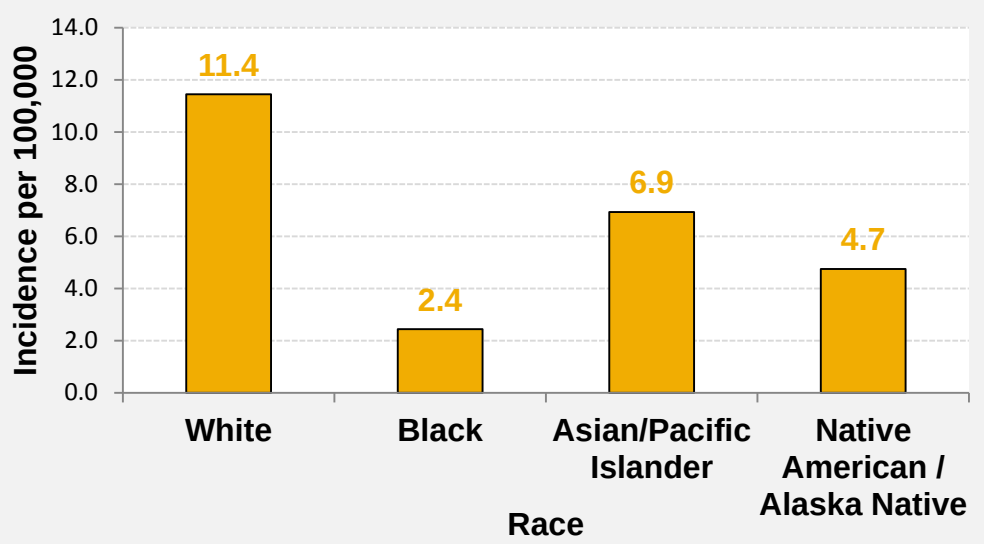
Confirmed and Probable Cases: 328

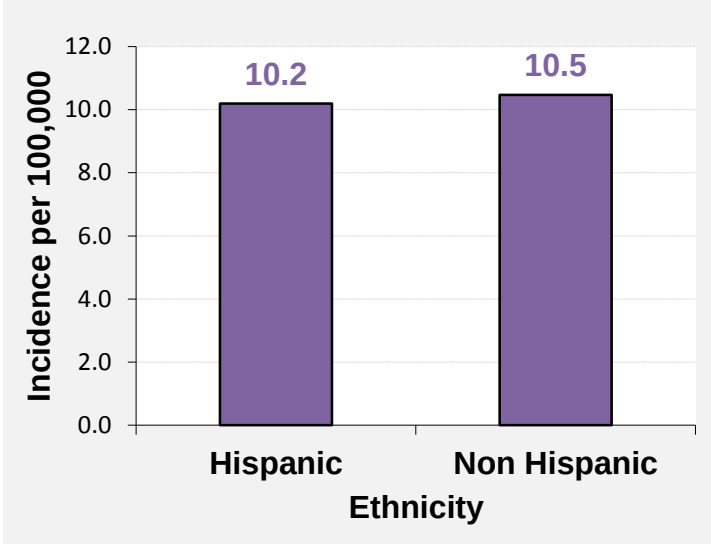
Kansas incidence per 100,000 population (2013): 11.3
U.S. incidence per 100,000 population (2013): *N/A*

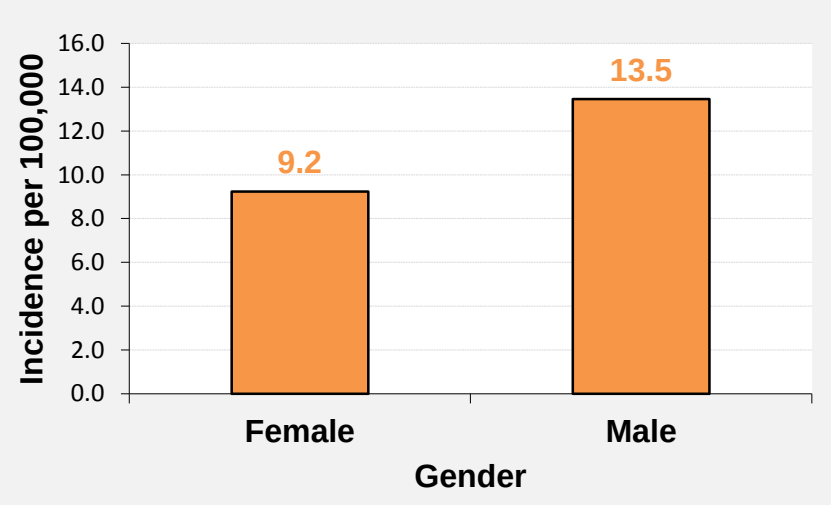


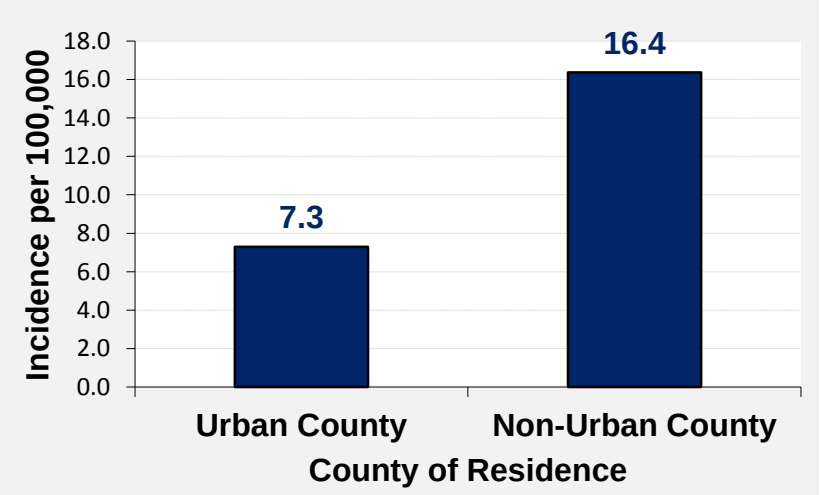
** A comparable U.S. rate is not available*

Campylobacteriosis incidence per 100,000 population, Kansas, 2013

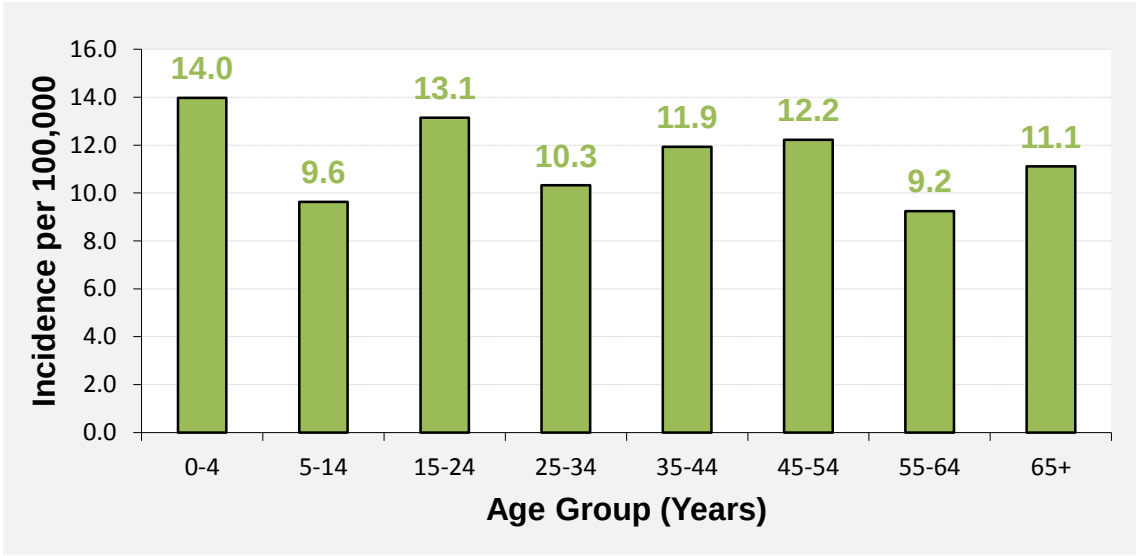




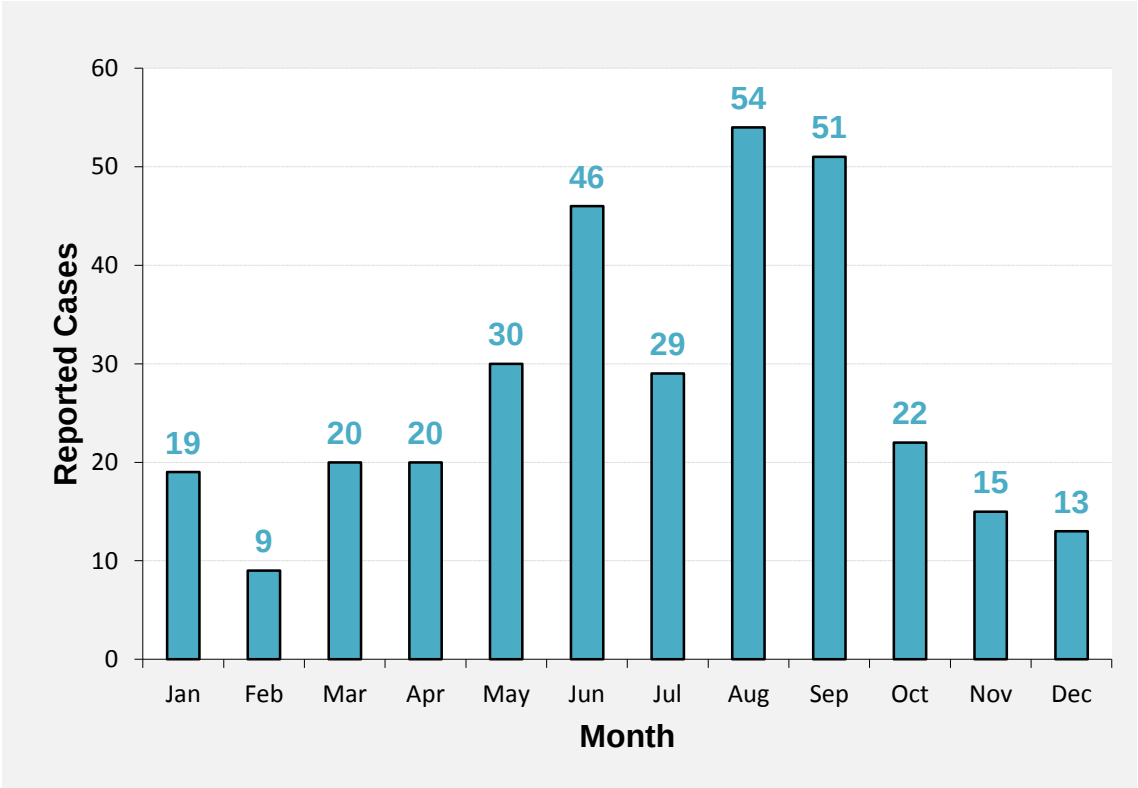




Campylobacteriosis incidence per 100,000 population, Kansas, 2013



Campylobacteriosis cases per month Kansas, 2013



CRYPTOSPORIDIOSIS

CLINICAL FEATURES: An illness characterized by profuse, watery diarrhea. Other symptoms that may appear include abdominal cramps, loss of appetite, severe weight loss, low-grade fever, nausea, and vomiting. Symptoms often wax and wane and disappear in two weeks among healthy people. Asymptomatic infections also occur.

CAUSATIVE AGENT: *Cryptosporidium* spp., a spore-forming coccidian protozoan. *C. parvum* and *C. hominis* are the most common species affecting humans.

MODE OF TRANSMISSION: Transmission occurs person-to-person, animal-to-person, waterborne and foodborne via the fecal-oral route. Reservoirs include humans, cattle, and other domestic animals.

INCUBATION PERIOD: 1 to 12 days (average 7 days)

PERIOD OF COMMUNICABILITY: As long as oocysts are present in the stool. Oocysts may be shed in stool from the onset of symptoms to several weeks after symptoms resolve.

PUBLIC HEALTH SIGNIFICANCE: *C. parvum* has been the cause of several large waterborne outbreaks (drinking and recreational) in recent decades. The oocysts are highly resistant to normal amounts of chemical disinfectants, including chlorine, and filtration is needed to remove the oocysts from public water supplies.

With a low infectious dose (as low as 10 organisms) and a long shedding period (sometimes up to 2 months), cryptosporidiosis is extremely contagious and may be easily transmitted person-to-person. Attack rates of 30% to 60% have been reported in outbreaks associated with childcare centers.

Though all individuals are at risk for infection, young children and pregnant women may be more susceptible to dehydration. Illness among immunocompromised individuals, especially persons with HIV/AIDS, may be life-threatening.

REPORTABLE DISEASE IN KANSAS SINCE: 1997

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES:

- *Confirmed: Evidence of Cryptosporidium organisms or DNA in stool, intestinal fluid, tissue samples, biopsy specimens, or other biological sample by certain laboratory methods with a high positive predictive value (PPV), e.g.,*
  - *Direct fluorescent antibody [DFA] test,*
  - *Polymerase chain reaction [PCR],*
  - *Enzyme immunoassay [EIA], OR*
  - *Light microscopy of stained specimen.*
- *Probable*: The detection of *Cryptosporidium* antigen by a screening test method, such as immunochromatographic card/rapid card test; or a laboratory test of unknown method.

SURVEILLANCE CASE DEFINITIONS

- *Confirmed*: a case that is diagnosed with *Cryptosporidium* spp. infection based on laboratory testing using a method listed in the confirmed criteria.

- *Probable:*
  - A case with supportive laboratory test results for *Cryptosporidia* spp. infection using a method listed in the probable laboratory criteria. When the diagnostic test method on a laboratory test result for cryptosporidiosis cannot be determined, the case can only be classified as probable, OR
  - A case that meets the clinical criteria and is epidemiologically linked to a confirmed case.

EPIDEMIOLOGY AND TRENDS

In 2013, 100 confirmed and probable cryptosporidiosis cases were reported among Kansas residents. The three-year median from 2010-2012 was 106 cases.

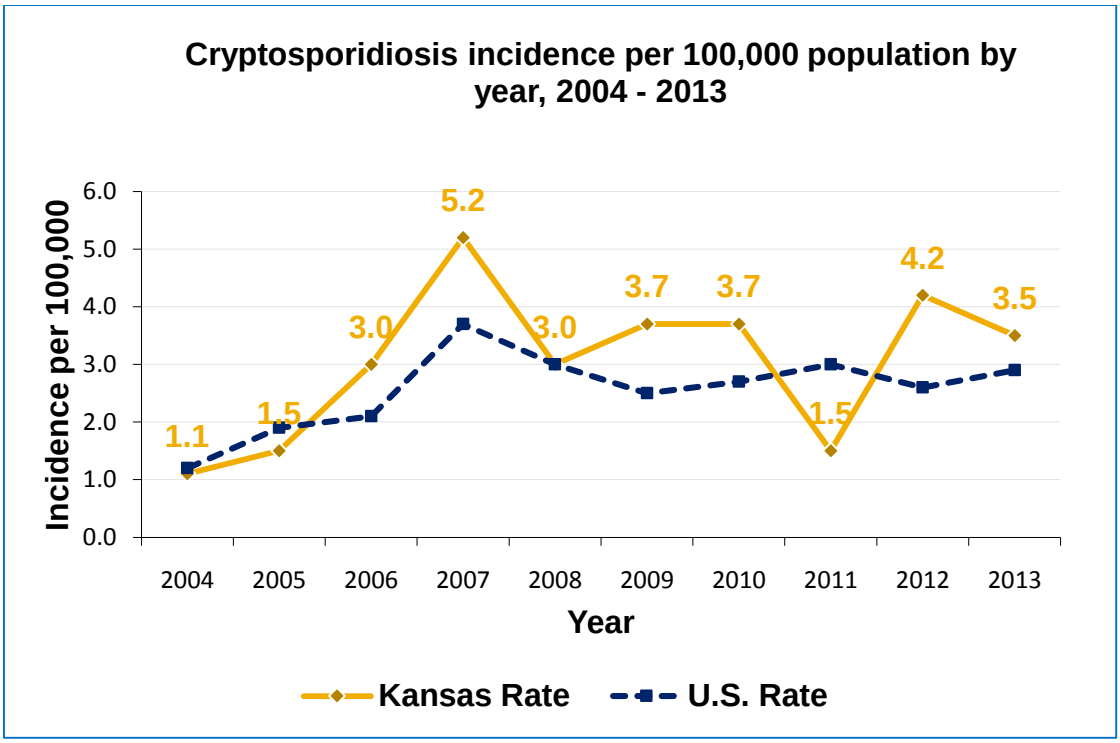
The highest rate of infection (5.16 per 100,000) was among individuals between 25 and 34 years of age. 42 cases (42%) reported contact with animals, 25 cases (25%) reported contact with manure, and 12 cases (12%) reported swimming or wading in recreational water prior to onset of cryptosporidiosis symptoms.

Twenty (20%) cases were hospitalized, and two (2%) deaths were reported.

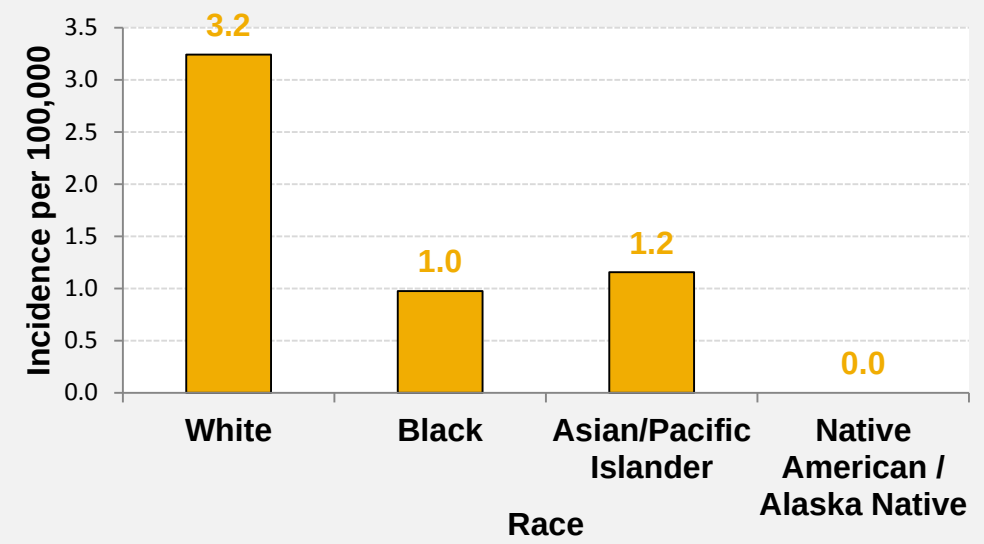
One cryptosporidiosis outbreak occurred in Kansas in 2013. In April 2013, KDHE and the Thomas County Health Department investigated an outbreak of cryptosporidiosis associated with handling young Holstein calves during the response to a cattle truck rollover. Six persons (40% of responders to this emergency) had outbreak cases of cryptosporidiosis. This was the first report of both law enforcement and volunteer emergency responders contracting *Cryptosporidium* for which the mode of transmission was confirmed to be solely zoonotic. An outbreak report can be found on the KDHE website, and a report published in the Morbidity and Mortality Weekly Report is available on the CDC website.

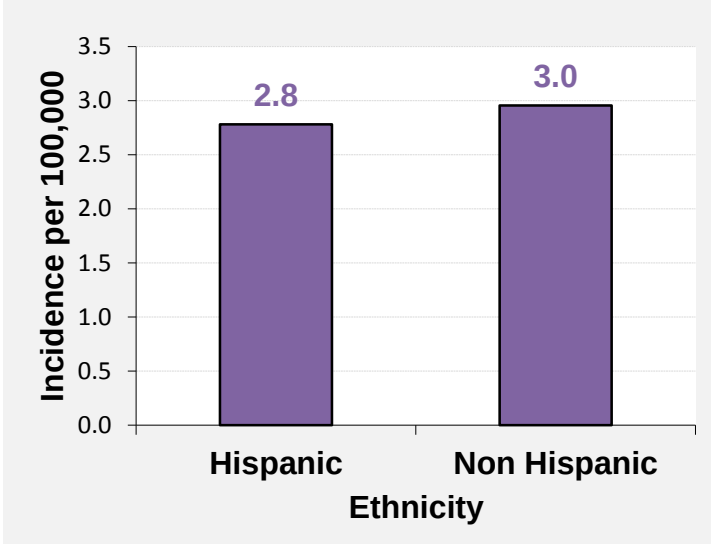
Confirmed and Probable Cases: 100

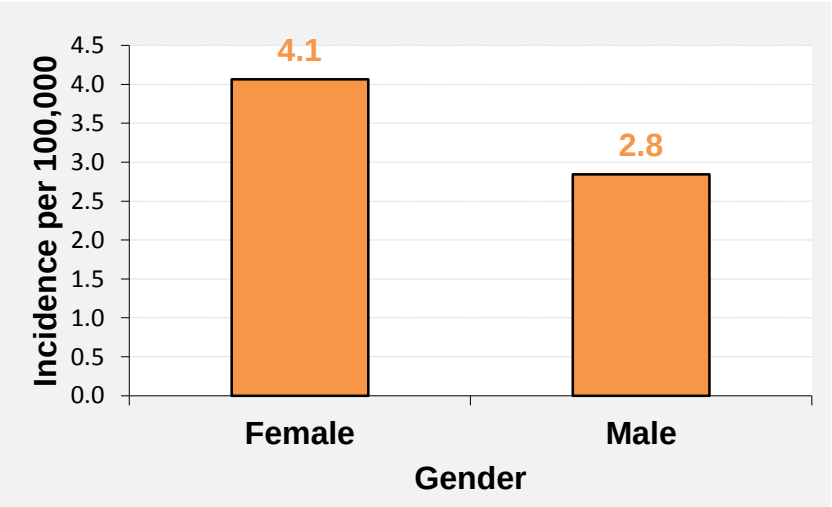
Kansas incidence per 100,000 population (2013):	3.46
U.S. incidence per 100,000 population (2013):	2.89

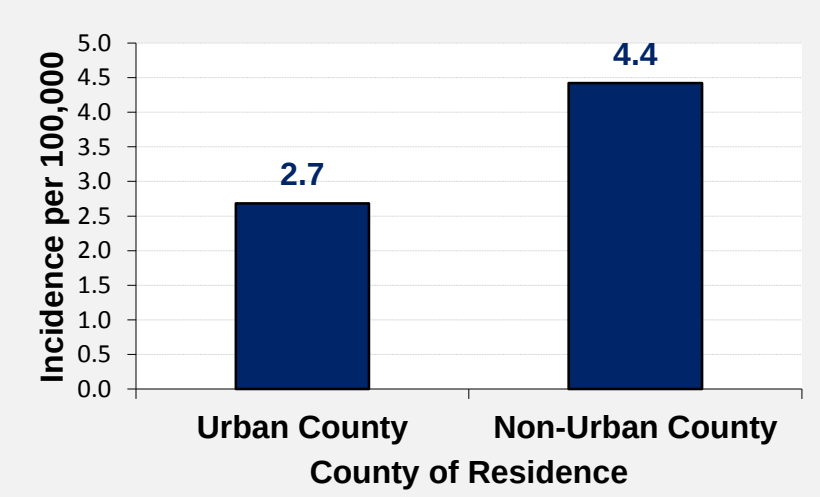

Cryptosporidiosis incidence per 100,000 population by year, 2004 - 2013
Incidence per 100,000
6.0
5.0
4.0
3.0
2.0
1.0
0.0
1.1
1.5
3.0
5.2
3.0
3.7
3.7
1.5
4.2
3.5
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Kansas Rate
U.S. Rate

Cryptosporidiosis incidence per 100,000 population, Kansas, 2013

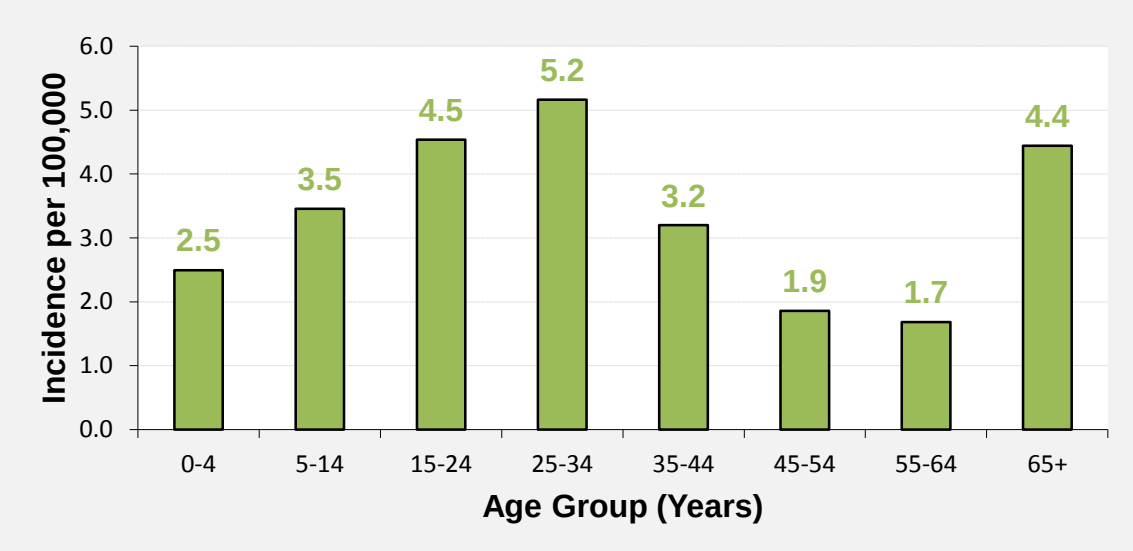




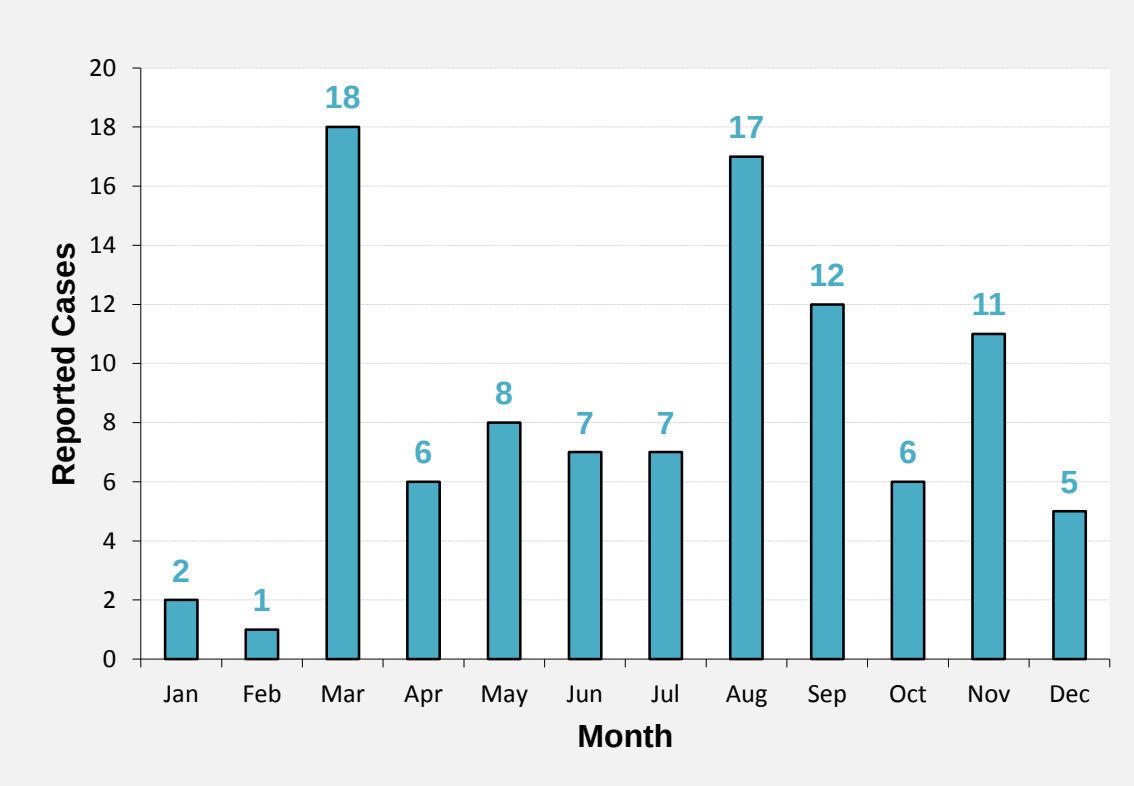




Cryptosporidiosis incidence per 100,000 population, Kansas, 2013



Cryptosporidiosis cases per month Kansas, 2013



CYCLOSPORIASIS

CLINICAL FEATURES: An illness characterized by profuse, watery diarrhea. Other common symptoms include loss of appetite, weight loss, abdominal cramps/bloating, nausea, body aches, and fatigue. Vomiting and low-grade fever also may be noted. Without treatment, symptoms can persist for several weeks to a month or more. Some symptoms, such as diarrhea, can return; and some symptoms, such as muscle aches and fatigue, may continue after the gastrointestinal symptoms have gone away. Asymptomatic infections also occur.

CAUSATIVE AGENT: *Cyclospora cayetanensis*, a protozoan parasite

MODE OF TRANSMISSION: Transmission occurs by ingestion of sporulated oocysts, the infective form of the parasite, in water or food contaminated by feces of an infected animal. An infected person sheds unsporulated (immature, non-infective) Cyclospora oocysts in the feces. The oocysts are thought to require days to weeks in favorable environmental conditions to sporulate (become infective). Therefore, direct person-to-person transmission is unlikely, as is transmission via ingestion of newly contaminated food or water.

INCUBATION PERIOD: 2 days to more than 2 weeks (average 7 days)

PERIOD OF COMMUNICABILITY: Direct person-to-person transmission is unlikely; infected persons can shed organisms in their stool for up to a month, but these organisms are not infectious and require time in the environment to mature and sporulate before they are capable of causing infection.

PUBLIC HEALTH SIGNIFICANCE: Cyclosporiasis represents a growing burden of foodborne disease in the United States. Americans traveling to tropical or subtropical regions where *Cyclospora* is endemic may be at increased risk for illness; cases not associated with travel are often associated with imported fresh produce.

REPORTABLE DISEASE IN KANSAS SINCE: 2005

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

- *Confirmed:* The detection of *Cyclospora* organisms or DNA in stool, intestinal fluid/aspirate, or intestinal biopsy specimens.

SURVEILLANCE CASE DEFINITIONS

- *Confirmed*: a case that meets the clinical description and at least one of the criteria for laboratory confirmation as described above.

- *Probable:* a case that meets the clinical description and is epidemiologically linked to a confirmed case.

EPIDEMIOLOGY AND TRENDS

Although cyclosporiasis has been reportable in Kansas since 2003, 2013 marked the first cases of the disease reported in the state. All four cases were associated with a large multi-state outbreak linked to a salad mix produced by Taylor Farms de Mexico and sold in Iowa and Nebraska restaurants. No hospitalizations or deaths were reported among Kansas cases.

Confirmed and Probable Cases: 4

Kansas incidence per 100,000 population (2013):	0.14
U.S. incidence per 100,000 population (2013):	0.28

DENGUE FEVER/DENGUE HEMORRHAGIC FEVER

CLINICAL FEATURES: Illness can range from a mild, non-specific febrile syndrome (dengue-like illness) to classic dengue fever (DF), to rare but potentially fatal forms of the disease, dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS).

Classic DR is an acute febrile illness characterized by frontal headache, retro-ocular pain, muscle bone and joint pain and rash. Mild bleeding of nose or gums or easy bruising may be noticed.

DHF may manifest after a 2-7 days febrile phase. After the fever is gone, symptoms including persistent vomiting, severe abdominal pain, and difficulty breathing, may develop at the beginning of a critical phase where the capillaries are excessively permeable with plasma leaking into the peritoneum and pleural cavity.

The critical phase is marked by a low platelet count and hemorrhagic manifestations, tendency to bruise easily or other types of skin hemorrhages, bleeding nose or gums, and possibly internal bleeding.

CAUSATIVE AGENT: The viruses of dengue fever are flaviviruses. The same viruses are responsible for dengue hemorrhagic fever.

MODE OF TRANSMISSION: Bite of infected mosquitoes, principally *Aedes aegypti.* This is a day-biting species, with increased biting activity for 2 hours after sunrise and several hours before sunset.

INCUBATION PERIOD: In humans, symptoms of infected usually begin 4-7 days after the mosquito bite. After entering the mosquito in the blood meal, the virus requires 8-12 days incubation before it can then be transmitted to another human.

PERIOD OF COMMUNICABILITY: Humans transmit virus to mosquitoes during a 3-5 day period usually shortly before through to the end of the febrile period.

PUBLIC HEALTH SIGNIFICANCE: The role of public health is limited to surveillance and education. Prevention is accomplished through adopting personal behaviors to prevent being bitten by mosquitoes, and through destroying mosquito breeding sites.

REPORTABLE DISEASE IN KANSAS SINCE: Not explicitly reportable in Kansas, however, falls under the exotic or newly recognized disease clause.

CLINICAL CRITERIA FOR SURVEILLANCE PURPOSES

Dengue is defined by fever as reported by the patient or healthcare provider and the presence of one or more of the following signs and symptoms:

- Nausea/vomiting
- Rash
- Aches and pains

- Tourniquet test positive
- Leukopenia
- Any warning sign for severe dengue:
    - Abdominal pain or tenderness
    - Persistent vomiting
    - Extravascular fluid accumulation
    - Mucosal bleeding at any site
    - Liver enlargement
    - Increasing hematocrit concurrent with rapid decrease in platelet count

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

- *Confirmatory*:
    - Detection of DENV nucleic acid in serum, plasma, blood, cerebrospinal fluid (CSF), other body fluid or tissue by validated reverse transcriptase-polymerase chain reaction (PCR), or
    - Detection of DENV antigens in tissue by a validated immunofluorescence or immunohistochemistry assay, or
    - Detection in serum or plasma of DENV NS1 antigen by a validated immunoassay; or
    - Cell culture isolation of DENV from a serum, plasma, or CSF specimen; or
    - Detection or IgM anti-DENV by validated immunoassay in a serum specimen or CSF in a person living in a dengue endemic or non-endemic area of the United States without evidence of other flavivirus transmission; or
    - Detection of IgM anti-DENV in a serum specimen or CSF by validated immunoassay in a traveler returning from a dengue endemic area without ongoing transmission of another flavivirus, clinical evidence of co-infection with one of these flavivirus, or recent vaccination against a flavivirus; or
    - IgM anti-DENV seroconversion by validated immunoassay in acute and convalescent serum specimens
    - IgG anti-DENV seroconversion or $\geq$4-fold rise by a validated immunoassay in serum specimens collected >2 weeks apart, and confirmed by a neutralization test with a >4-fold higher end point titer as compared to other flaviviruses tested
- *Presumptive/Probable*:
    - Detection of IgM anti-DENV by validated immunoassay in a serum specimen or CSF in a person living in a dengue endemic or non-endemic are of the United States with evidence of other flavivirus transmission
    - Detection of IgM anti-DENV in a serum specimen or CSF by validated immunoassay in a traveler returning from a dengue endemic area with ongoing transmission of another flavivirus, clinical evidence of co-infection with one of these flaviviruses, or recent vaccination against a flavivirus
- *Suspected*:
    - The absence of IgM anti-DENV by validated immunoassay in a serum or CSF specimen collected <5 days after illness onset and in which molecular diagnostic testing was not performed in patient with and epidemiologic linkage

SURVEILLANCE CASE DEFINITIONS

- *Confirmed:* A clinically compatible case of dengue-like illness, dengue, or severe dengue with confirmatory laboratory results.
- *Probable:* A clinically compatible case of dengue-like illness, dengue, or severe dengue with laboratory results indicative of probable infection.
- *Suspect:* A clinically compatible case of dengue-like illness, dengue, or severe dengue with an epidemiologic linkage.

EPIDEMIOLOGY AND TRENDS

In 2013, there were 8 probable cases of dengue virus infections. The median age was 27 years (range, 16 – 47 years). None of the cases were hospitalized and there were no deaths.

All eight cases were associated with international travel.

Confirmed and Probable Cases: 8

Kansas incidence per 100,000 population (2013):	0.28
U.S. incidence per 100,000 population (2013):	0.27

EHRLICHIOSIS AND ANAPLASMOSIS

CLINICAL FEATURES: Ehrlichiosis and anaplasmosis are infections attributable to different pathogens but with similar signs, symptoms, and clinical courses. All are acute, febrile, bacterial illnesses. The spectrum of disease ranges from subclinical infection to severe, life-threatening, or fatal disease. Symptoms are nonspecific but most commonly include sudden onset of fever, chills, general malaise, headache, muscle and joint pain, sore throat and sleeplessness. Generalized lymphadenopathy with tenderness of the enlarged lymph nodes is common. Complications may include leukopenia, anemia, and hepatitis. Symptoms typically last 1 to 2 weeks, and recovery generally occurs without sequelae; however, neurologic complications have been reported in some children after severe disease. Fatal infections have also been reported.

CAUSATIVE AGENT: *Ehrlichia spp.,* gram-negative cocci bacteria, including *Ehrlichia chafeensis* and *Ehrlichia ewingii*. *Anaplasma* (formerly *Ehrlichia) phagocytophilium* causes anaplasmosis.

MODE OF TRANSMISSION: Ehrlichial infections caused by *Ehrlichia chaffeensis* and *E ewingii* are associated with the bite of the lone star tick (*Amblyomma americanum*). Another tick, *Ixodes scapularis,* is the likely vector of *Anaplasma phagocytophila*. The reservoirs of *E. chaffeensis* and *E. ewingii* ehrlichiosis are white-tailed deer and dogs. The major reservoirs of *A. phagocytophilum* are ruminants, cervids, and field rodents.

INCUBATION PERIOD: 5 to 10 days after a tick bite or exposure (median=9 days)

PERIOD OF COMMUNICABILITY: No evidence of transmission from person to person.

PUBLIC HEALTH SIGNIFICANCE: Limiting exposure to ticks can prevent infection.

REPORTABLE DISEASE IN KANSAS SINCE: 2000

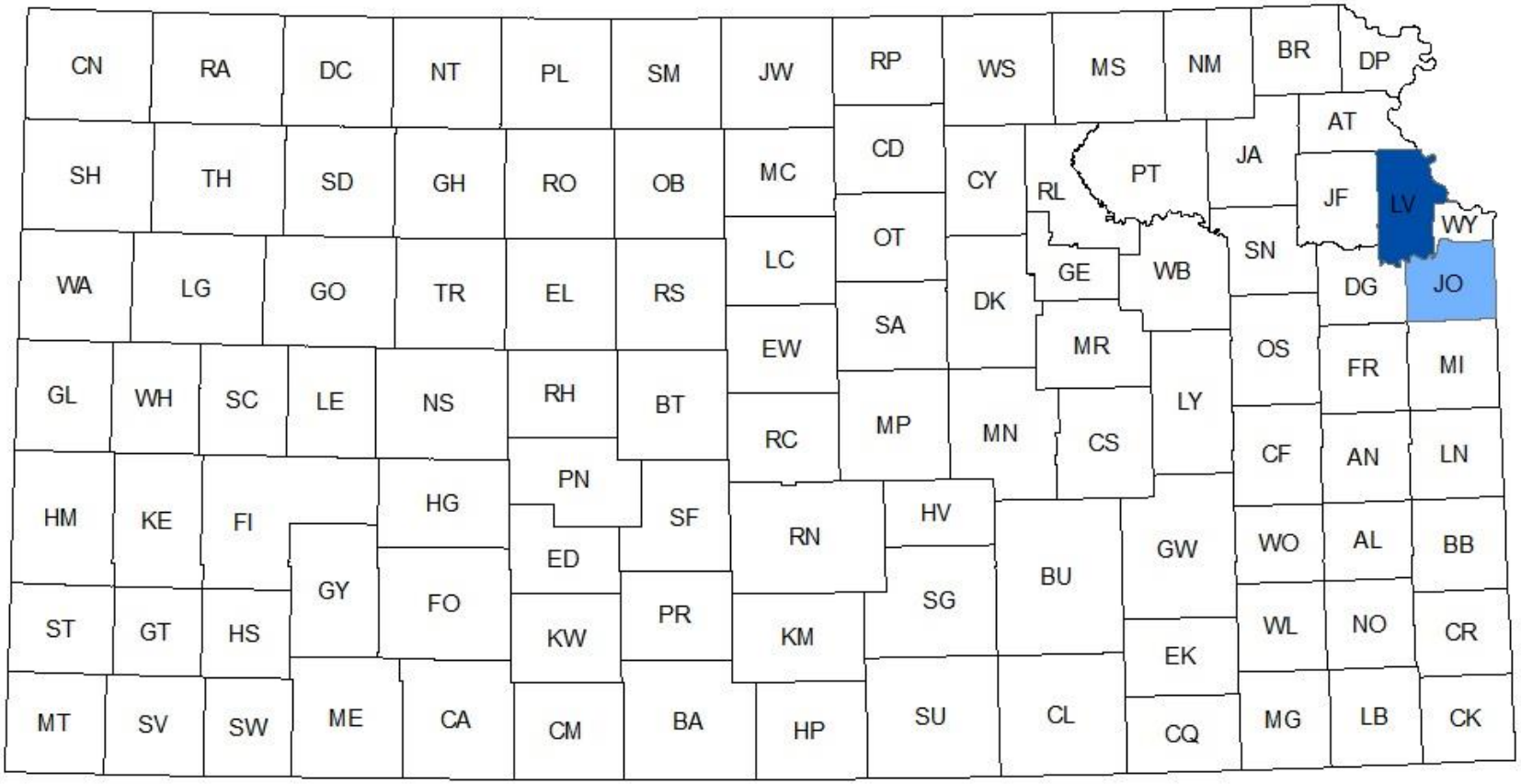
EPIDEMIOLOGY AND TRENDS

In 2013, 96 confirmed and probable cases of ehrlichiosis and anaplasmosis were reported in Kansas: 86 cases were caused by *Ehrlichia chaffeensis* (32 confirmed cases and 54 probable cases), seven by *Anaplasma phagocytophilum* (all probable cases), and three by *Ehrlichia ewingii* (two confirmed cases and one probable case). Fifty-two (54%) cases of ehrlichiosis and anaplasmosis were hospitalized, and no deaths were reported. Cases ranged in age from 10 to 87 years, with a median age of 53 years. Sixty-seven (70%) cases were male.

For 77 cases, tick exposure most likely occurred within their county of residence (Figure 1, Figure 2); the remaining cases may have been exposed outside of their home county or state.

	Ehrlichiosis	Anaplasmosis
Confirmed and Probable Cases:	**89**	**7**
Kansas incidence per 100,000 population (2013):	3.07	0.24
U.S. incidence per 100,000 population (2013):	0.52	0.93

Figure 1: Incidence* of anaplasmosis per 100,000 population by county, Kansas, 2013 (n=5)

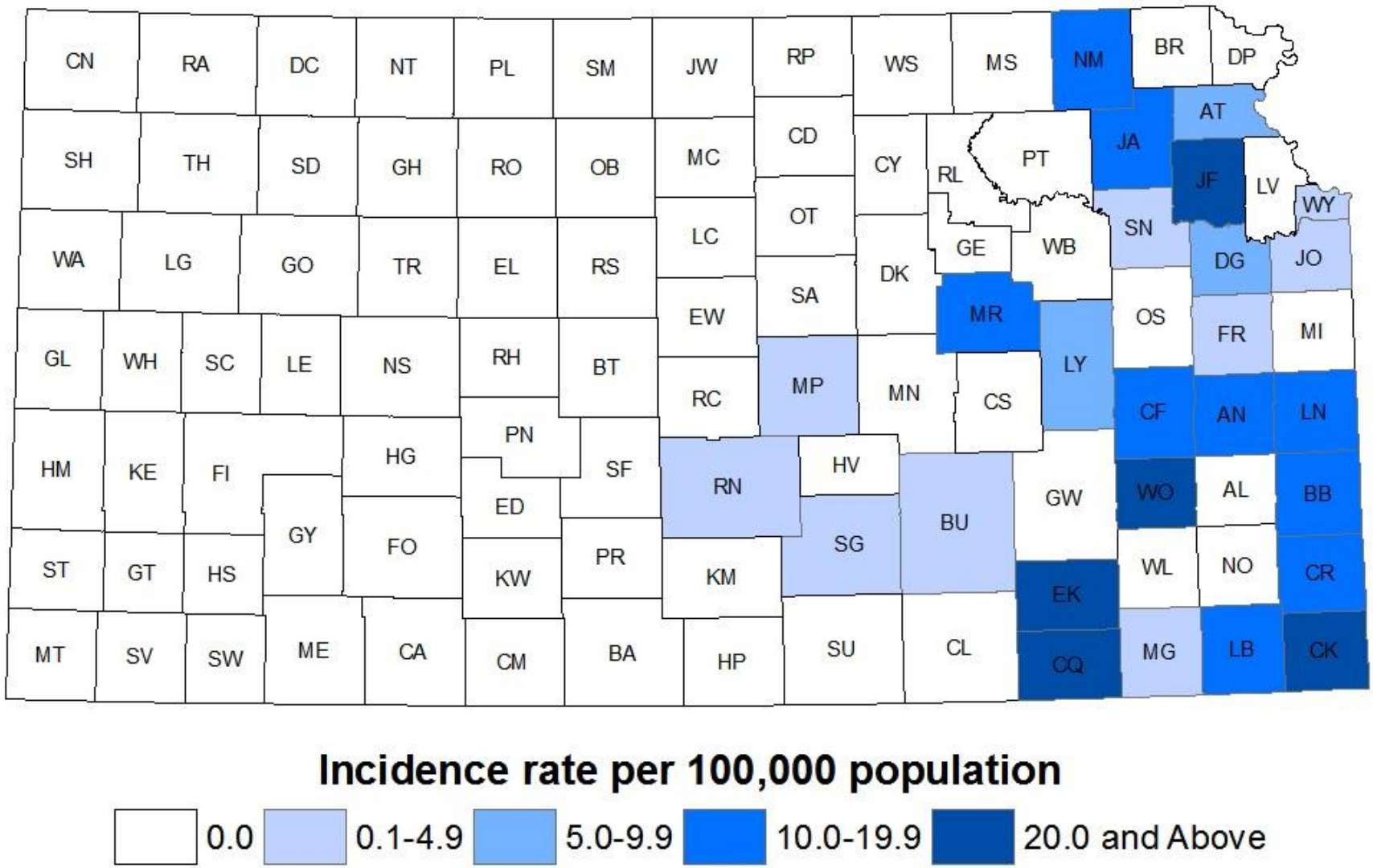


Incidence rate per 100,000 population

0.0 0.1-0.9 1.0 and Above

**Cases with reported tick exposure outside their county of residence or unknown exposures were excluded*

Figure 2: Incidence* of ehrlichiosis per 100,000 population by county, Kansas, 2013 (n=72)



*Cases with reported tick exposure outside their county of residence or unknown exposures were excluded

GIARDIASIS

CLINICAL FEATURES: A gastrointestinal illness characterized by diarrhea, abdominal cramps, bloating, frequent loose and pale stools, malabsorption of fat and fat-soluble vitamins, fatigue, and weight loss. In severe giardiasis, damage to the duodenal and jejunal mucosal cells may occur. Infection is often asymptomatic.

CAUSATIVE AGENT: *Giardia lamblia*, a protozoan parasite

MODE OF TRANSMISSION: Transmission is via the fecal-oral route, primarily through ingestion of contaminated drinking or recreational water, and less often from contaminated food. Person-to-person and animal-to-person transmission can occur. While humans are the principal reservoir of the infection, dogs, cats, beavers, and other animals can also be infected.

INCUBATION PERIOD: Ranges from 3-25 days or longer (average of 7-10 days).

PERIOD OF COMMUNICABILITY: Entire period of infection. *Giardia* is often shed in the stool for months.

PUBLIC HEALTH SIGNIFICANCE: Disease may be prevented by promotion of good hand washing. Institutional outbreaks, especially in child day care centers, may result from person-to-person transmission - exclusion policies may apply to infected day care enrollees, food workers, and direct patient care providers.

REPORTABLE DISEASE IN KANSAS SINCE: 1982

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

- Detection of *Giardia* organisms, antigen, or DNA in stool, intestinal fluid, tissue samples, biopsy specimens or other biological sample.

SURVEILLANCE CASE DEFINITIONS

- *Confirmed:* a case that meets the clinical description and the criteria for laboratory confirmation as described above. When available, molecular characterization (e.g., assemblage designation) should be reported.

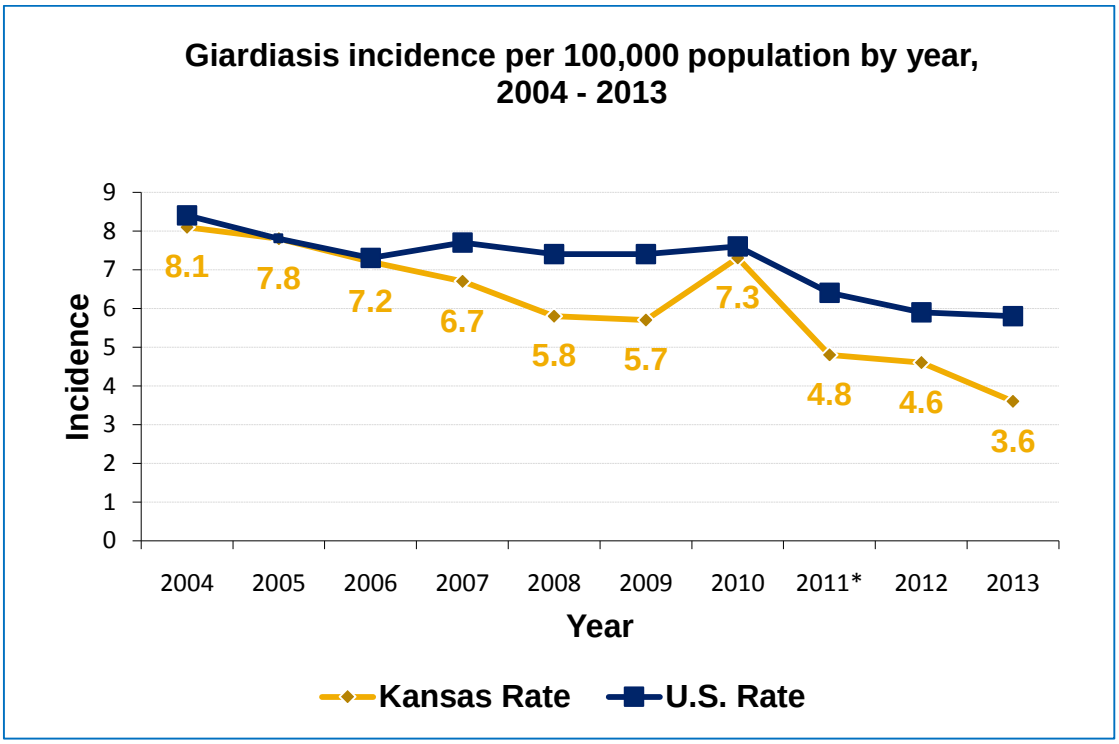
- *Probable:* A case that meets the clinical description and that is epidemiologically linked to a confirmed case.

EPIDEMIOLOGY AND TRENDS

In 2013, 104 confirmed and probable cases were reported in Kansas. The three-year median for 2010-2012 was 171 cases. Cases ranged in age from one year to 83 years. The median age was 32.5 years. The highest incidence rate (8.48 per 100,000) occurred in those under 5 years of age.

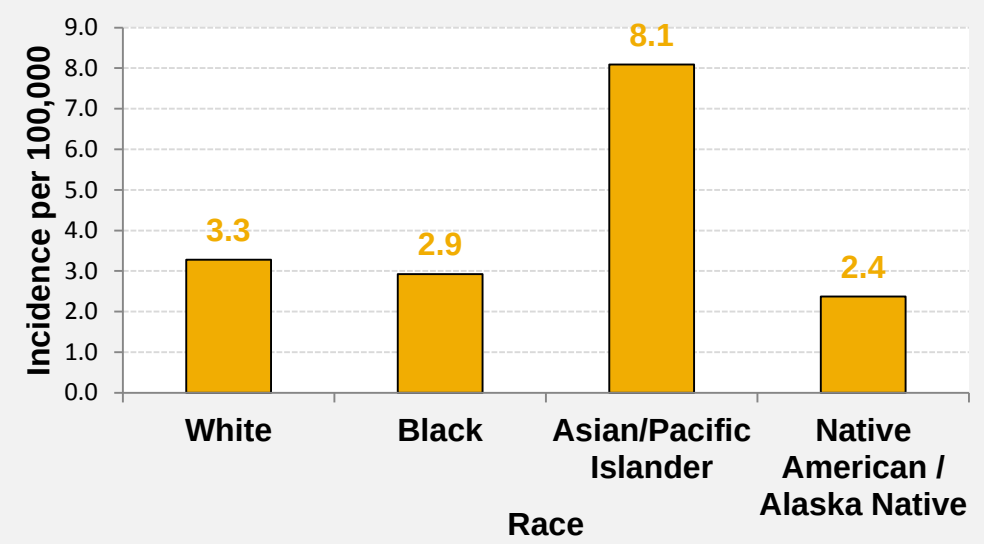
Confirmed and Probable Cases: 104

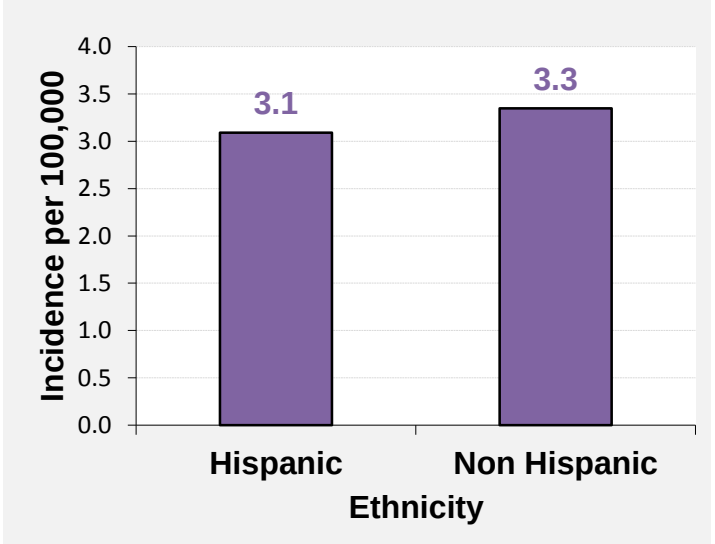
Kansas incidence per 100,000 population (2013): 3.59
U.S. incidence per 100,000 population (2013): 5.80

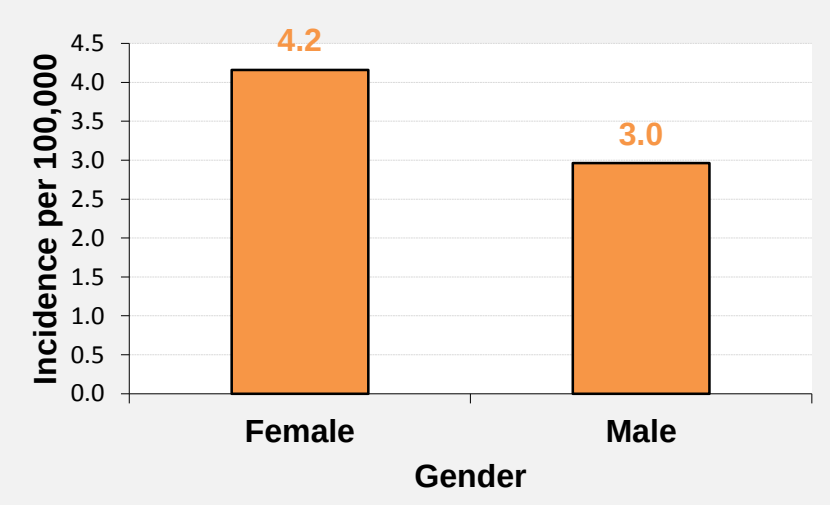


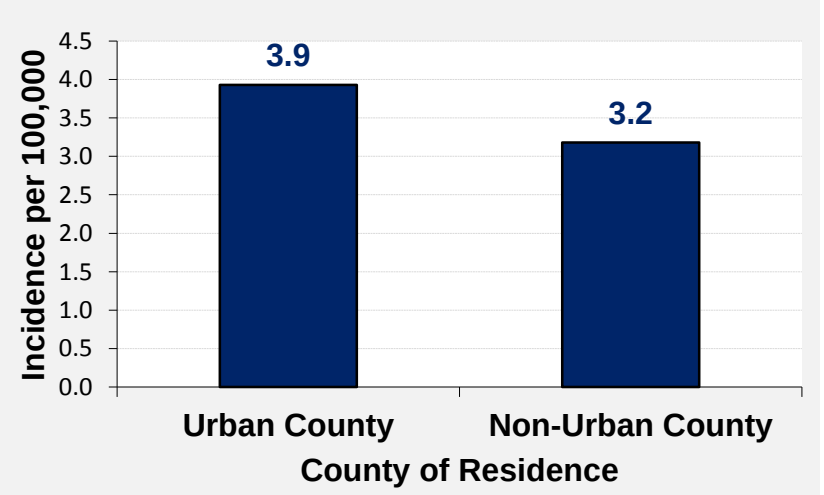
**** Kansas and national case definition altered in 2011***

Giardiasis incidence per 100,000 population, Kansas, 2013

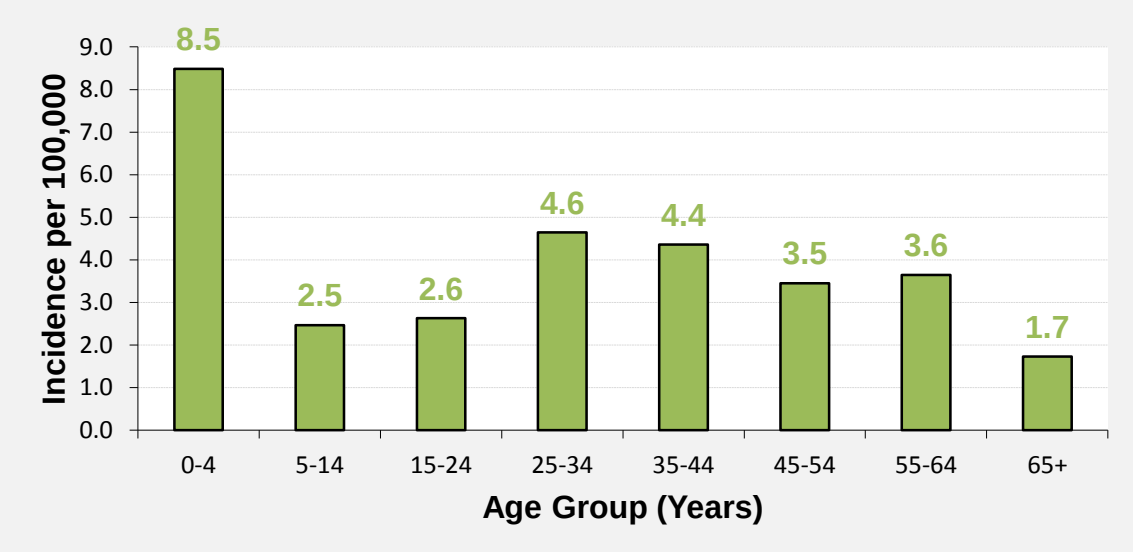




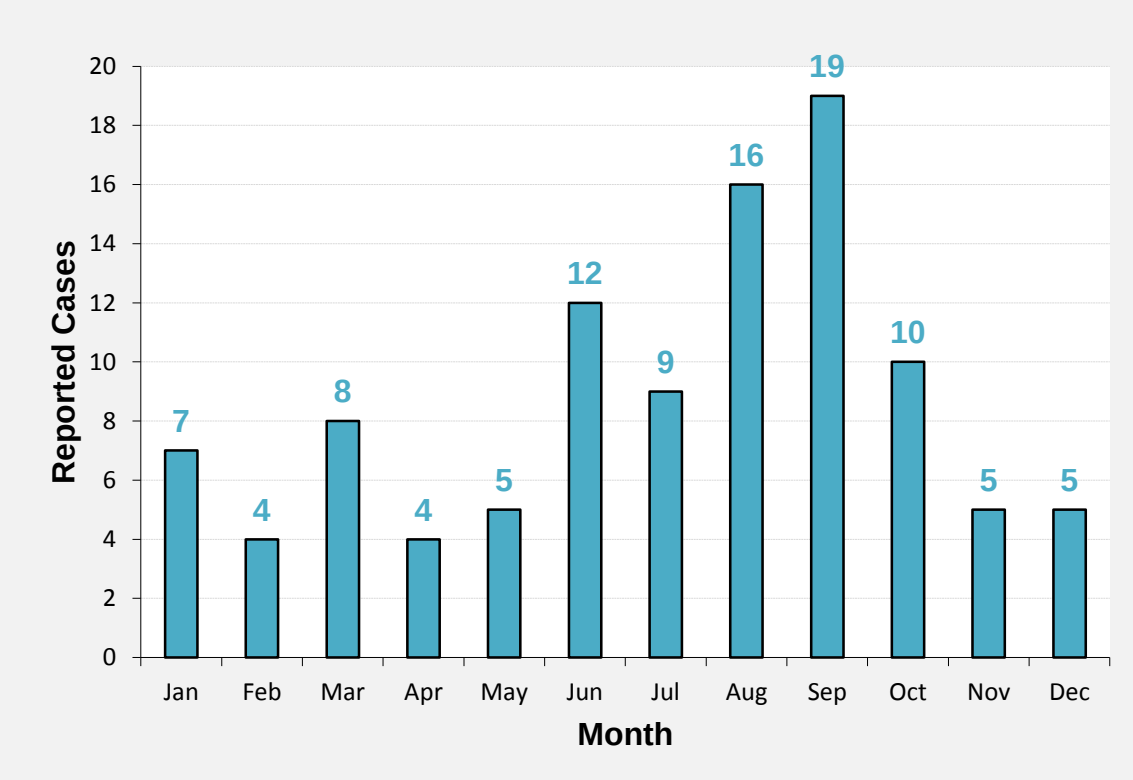




Giardiasis incidence per 100,000 population, Kansas, 2013



Giardiasis cases per month
Kansas, 2013



HAEMOPHILUS INFLUENZAE, INVASIVE DISEASE

CLINICAL FEATURES: Several clinical syndromes including meningitis, septic arthritis, epiglottitis, cellulitis, bacteremia, and pneumonia may characterize invasive infection. Symptoms of meningitis may include fever, headache, lethargy, vomiting, and stiff neck. Other symptoms depend on the part of the body affected.

CAUSATIVE AGENT: *Haemophilus influenzae*, a gram-negative bacterium with six serotypes (a through f)

MODE OF TRANSMISSION: Found in the upper respiratory tract of humans, the organism may be transmitted by direct contact or droplet inhalation of respiratory tract secretions.

INCUBATION PERIOD: Unknown; probably short, 2-4 days.

PERIOD OF COMMUNICABILITY: As long as organisms are present, which may be for a prolonged period, even without nasal discharge. Considered non-communicable within 24-48 hours after starting effective antibiotic therapy.

PUBLIC HEALTH SIGNIFICANCE: Before *H. influenzae* type B (HiB) conjugate vaccinations, *H. influenzae* type B was the leading cause of invasive diseases among children under 5 years of age. Immunization has been an effective method of limiting invasive HiB disease. Preventive antibiotics may prevent illness in close contacts to known cases of HiB, especially susceptible children.

REPORTABLE DISEASE IN KANSAS SINCE: 1997

EPIDEMIOLOGY AND TRENDS

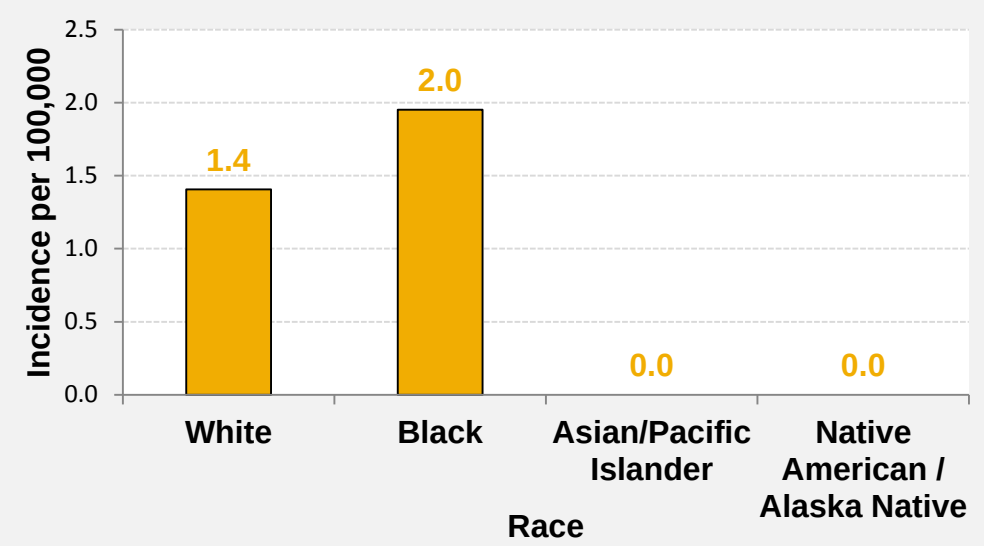
Confirmed and Probable Cases: 40

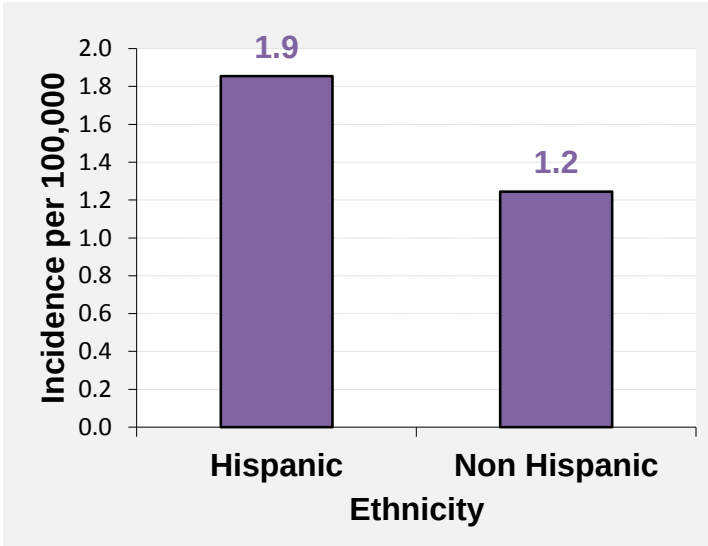
Kansas incidence per 100,000 population (2013): 1.38
U.S. incidence per 100,000 population (2013): 1.21

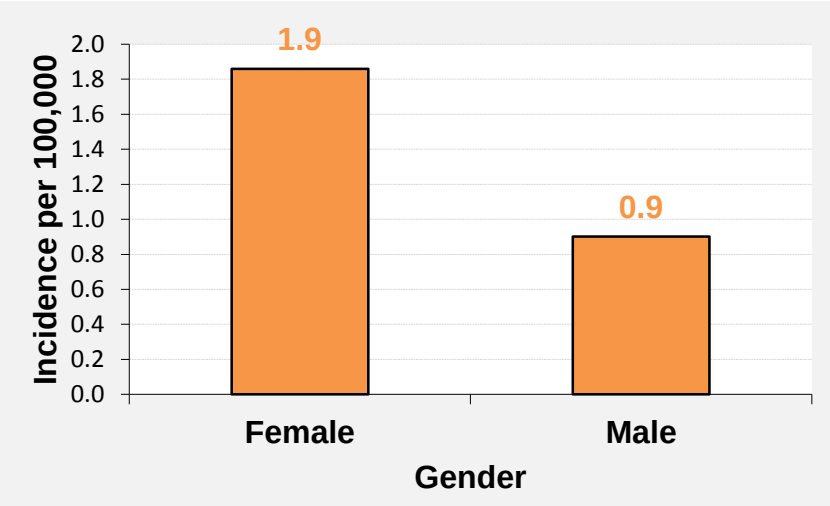
In 2013, there were 40 confirmed cases of invasive *Haemophilus influenzae* infections reported in Kansas. The cases ranged from less than one year of age to 100 years; the median age was 62 years.

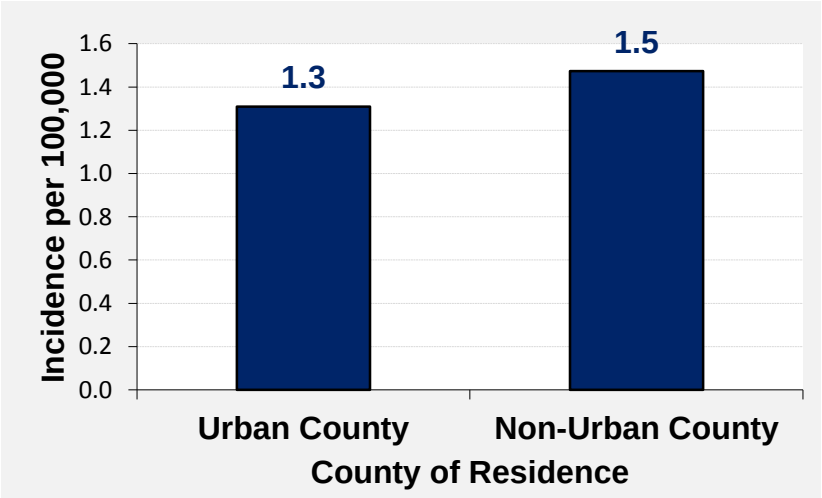
Serotyping information was available for 18 bacterial isolates. One serotype B (HiB) isolate was reported in a patient who was older than 65 years of age. No post-exposure chemoprophylaxis was required for any contacts of the patient.

Haemophilus influenzae (invasive) incidence per 100,000 population, Kansas 2013

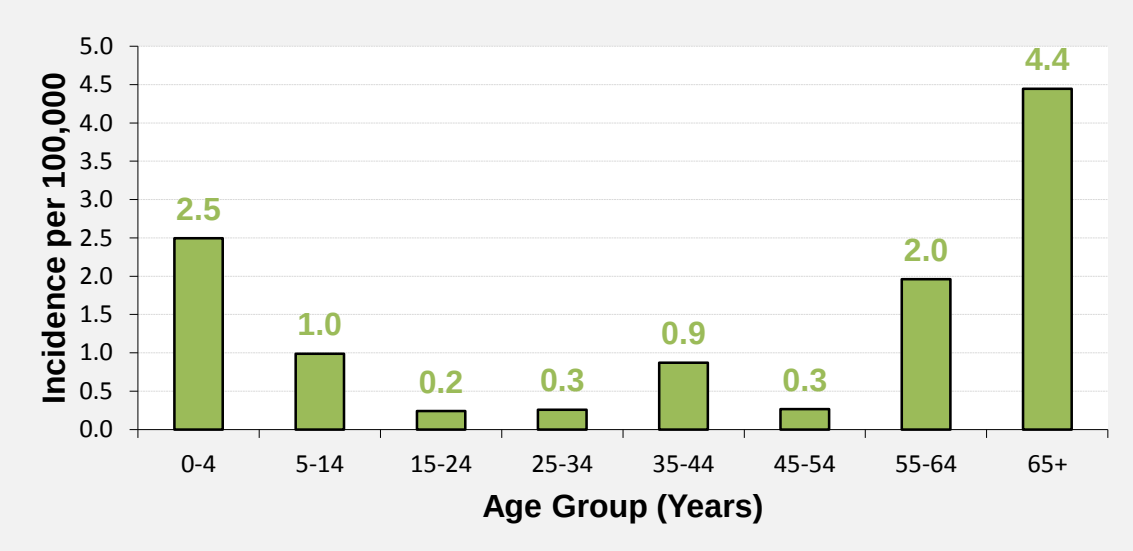




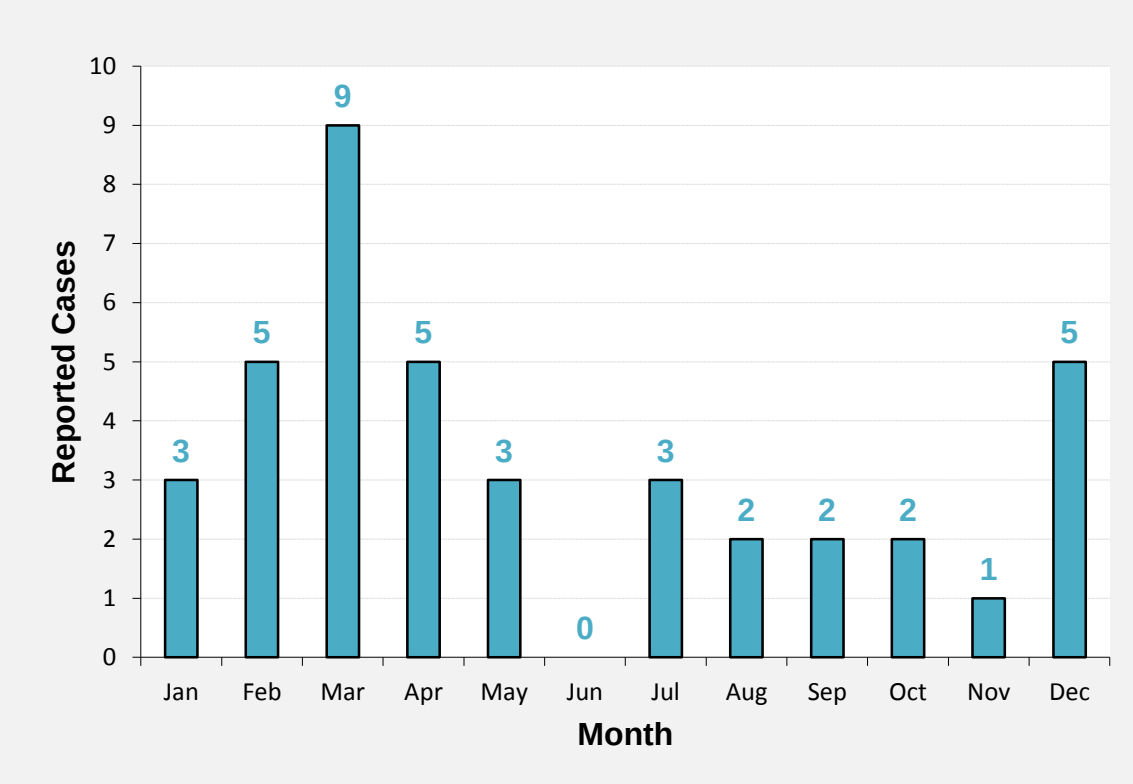




Haemophilus influenzae (invasive) incidence per 100,000 population, Kansas 2013



Haemophilus influenzae (invasive) cases per month Kansas, 2013



HEMOLYTIC UREMIC SYNDROME, POSTDIARRHEAL

CLINICAL FEATURES: Hemolytic uremic syndrome (HUS) is characterized by the acute onset of microangiopathic hemolytic anemia, renal injury, and low platelet count. Thrombotic thrombocytopenic purpura (TTP) also is characterized by these features but can include central nervous system (CNS) involvement and fever and may have a more gradual onset. Most cases of HUS (but few cases of TTP) occur after an acute gastrointestinal illness (usually diarrheal). Some evidence has suggested that the use of antimicrobial therapy may precipitate complications like HUS.

Many patients with HUS require blood transfusions (about 70% of cases) or dialysis (50%); up to a quarter have neurological symptoms including stroke, seizure, or coma. Kidney function returns in up to 70% of HUS cases, but some individuals can experience permanent kidney failure. HUS is fatal in about 5% of cases.

CAUSATIVE AGENT: Shiga toxin-producing bacteria, particularly Shiga toxin-producing *Escherichia coli* (STEC) including *E. coli* O157:H7 which causes an estimated 90% of HUS cases. *Shigella dysenteriae* type 1 may also cause HUS. HUS develops in about 5% of sporadic STEC cases, but in up to 20% of infections with outbreak strains of STEC.

MODE OF TRANSMISSION: HUS is not transmissible, although its causative agent may be transmitted via the fecal-oral route—susceptible individuals ingest food or liquids contaminated with human or animal feces. Outbreaks have been linked to animal contact, eating undercooked ground beef, consuming contaminated produce, and drinking contaminated water or unpasteurized juice. Person-to-person transmission may also occur, especially within daycare settings and nursing homes.

INCUBATION PERIOD: Undefined. HUS is typically diagnosed a week or more after the onset of diarrhea

PERIOD OF COMMUNICABILITY: *N/A*

PUBLIC HEALTH SIGNIFICANCE: HUS is most commonly caused by *E. coli* O157:H7, a bacterium often associated with contaminated beef and food products. Monitoring this disease serves as a potential indicator to problems in meat, fruit, and/or vegetable processing. Risk for HUS may be lowered if *E. coli* O157:H7 enteritis patients are not treated with antimicrobial agents.

REPORTABLE DISEASE IN KANSAS SINCE: 2000

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

- Anemia (acute onset) with microangiopathic changes (i.e., schistocytes, burr cells, or helmet cells) on peripheral blood smear, ***AND***
- Renal injury (acute onset) evidenced by either hematuria, proteinuria, or elevated creatinine level (i.e., greater than or equal to 1.0 mg/dL in a child aged less than 13 years

or greater than or equal to 1.5 mg/dL in a person aged greater than or equal to 13 years, or greater than or equal to 50% increase over baseline)

Surveillance Case Definitions

- *Confirmed*: an acute illness diagnosed as HUS or TTP that both meets the laboratory criteria and began within 3 weeks after onset of an episode of acute or bloody diarrhea

- *Probable*:

    - An acute illness diagnosed as HUS or TTP that meets the laboratory criteria in a patient who does not have a clear history of acute or bloody diarrhea in preceding 3 weeks, ***OR***

    - An acute illness diagnosed as HUS or TTP, that a) has onset within 3 weeks after onset of an acute or bloody diarrhea and b) meets the laboratory criteria except that microangiopathic changes are not confirmed

Epidemiology and Trends

In 2013, four confirmed cases of postdiarrheal hemolytic uremic syndrome were reported in Kansas. The three-year median for 2010-2012 was three cases.

All four (100%) cases were hospitalized; one (25%) person died. All four of the cases tested positive for Shiga toxin-producing *E. coli*; two persons had serotype O157, one person had serotype O26, and one person had serotype O5. All cases were in persons under 14 years of age.

Confirmed and Probable Cases: 4

Kansas incidence per 100,000 population (2013): 0.14
U.S. incidence per 100,000 population (2013): 0.11

HEPATITIS A

CLINICAL FEATURES: Abrupt onset of fever, malaise, anorexia, abdominal cramps, and sometimes diarrhea. Jaundice may develop a few days after onset.

CAUSATIVE AGENT: Hepatitis A virus

MODE OF TRANSMISSION: Transmission is through person-to-person, direct fecal-oral contact; consumption of food or beverages contaminated by an infectious person (indirect-fecal oral contact); or consumption of undercooked food exposed to contaminated water or feces (i.e., mollusks, lettuce, strawberries)

INCUBATION PERIOD: 15 to 50 days (average 28 to 30 days)

PERIOD OF COMMUNICABILITY: From the latter half of the incubation period to a maximum of 7 days after the onset of jaundice. This can be as long as one month.

PUBLIC HEALTH SIGNIFICANCE: Hepatitis A incidence has decreased by 95% since 1995 when the inactivated hepatitis A vaccine was licensed. It is very effective in preventing infection, and is recommended for travelers to countries where hepatitis A is a common infection as well as for daycare attendees and high-risk adults and children residing in the US.

The goal of hepatitis A surveillance in Kansas is to identify cases and apply appropriate control measures. Control measures include contact identification and administration of post-exposure prophylaxis (PEP), which consists of either the hepatitis A vaccine or hepatitis A immune globulin (IG). If control measures are completed in a timely fashion, outbreaks can be prevented.

REPORTABLE DISEASE IN KANSAS SINCE: 1982

EPIDEMIOLOGY AND TRENDS

Eleven confirmed cases of hepatitis A were reported in Kansas in 2013. The three-year median for 2010-2012 was 14 cases.

Cases ranged in age from 7 to 87 years; the median age was 41 years. The majority of cases (73%) were female, and for the 10 cases where race and ethnicity was documented, 80% were white, non-Hispanic. There were seven hospitalizations but no deaths.

Twenty-two contacts were identified and 17 were recommended to receive either the hepatitis A vaccine or immunoglobulin as post-exposure prophylaxis; five contacts had previously been vaccinated for hepatitis A, and thus did not require any PEP. Three contacts were lost-to-follow-up. No hepatitis A outbreaks were identified in Kansas in 2013. Three investigations (27%) identified foreign travel or exposure to a foreign traveler as a risk factor.

Confirmed Cases: 11

Kansas incidence per 100,000 population (2013):	0.38
U.S. incidence per 100,000 population (2013):	0.57

HEPATITIS B

CLINICAL FEATURES: Acute hepatitis B is an acute illness characterized by anorexia, abdominal discomfort, nausea and vomiting. Jaundice is present in <10% of children and <50% of adults. A low-grade fever, rash, and joint pain may also be present. Chronic hepatitis B illness may or may not demonstrate symptoms of hepatic inflammation. Only about one third of patients have elevated aminotransferase levels, which may fluctuate with intermittent exacerbations of hepatic inflammation. Chronic cases may have no evidence of liver disease or may have a spectrum of disease ranging from chronic hepatitis to cirrhosis or liver cancer.

CAUSATIVE AGENT: Hepatitis B virus

MODE OF TRANSMISSION: Transmission occurs via percutaneous or permucaosal exposure: i.e. (1) infected blood or body fluids introduced at birth, (2) through sexual contact, or (3) by contaminated needles. Blood (and serum-derived fluids), saliva, semen, and vaginal fluids have been shown to be infectious. The likelihood of transmission is greater if the *e* antigen or viral DNA is present in an individual's blood.

INCUBATION PERIOD: 45 to 180 days (average 60 to 90 days)

PERIOD OF COMMUNICABILITY: All persons who are hepatitis B surface antigen (HBsAg) positive are potentially infectious; some individuals may clear the surface antigen from their blood, while others may not.

PUBLIC HEALTH SIGNIFICANCE: According to CDC, both acute and chronic hepatitis B cases are major causes of morbidity and mortality in the US. However, transmission of hepatitis B can be interrupted by vaccination and early identification of cases and their contacts. Timely identification of susceptible contacts of hepatitis B cases allows for effective post-exposure prophylaxis. Timely post-exposure prophylaxis is highly effective in preventing hepatitis B transmission from mother to infant. For this reason, all pregnant mothers are required to be tested for hepatitis B during pregnancy.

Routine hepatitis B vaccination is recommended for all children at birth, 1-2 and 6-18 months of age or, if not previously received, at 11-12 years of age. Hepatitis B vaccine is also recommended for persons in the following high risk groups: persons with occupational risk, clients and staff of institutions for the developmentally disabled; hemodialysis patients; recipients of certain blood products; household and sexual partners of HBsAg carriers; international travelers visiting high prevalence areas; injecting drug users; sexually active persons with multiple partners; and inmates of long-term facilities.

Hepatitis D virus causes hepatitis in individuals currently infected with hepatitis B (either acute or chronic); this is because hepatitis D virus cannot replicate without the presence of hepatitis B. Hepatitis D virus is important because it has the ability to cause an asymptomatic or mild chronic hepatitis B infection to become a more severe disease which can result in rapid progression to fulminant hepatitis.

REPORTABLE DISEASE IN KANSAS SINCE: 1982

ACUTE HEPATITIS B

CLINICAL CRITERIA

- An acute illness with a) discrete onset of symptoms **and** b) jaundice or serum aminotransferase levels (ALT) >100 IU/L

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

- Hepatitis B surface antigen (HBsAg) positive, ***AND***
- IgM antibody to hepatitis B core antigen (IgM anti-HBc) positive (if done)

SURVEILLANCE CASE DEFINITIONS

- *Confirmed:* a case that meets the clinical case definition, is laboratory confirmed, and is not known to have chronic hepatitis B

EPIDEMIOLOGY AND TRENDS

In 2013, ten confirmed acute cases of hepatitis B were reported in Kansas. The three-year median for 2009-2011 was eleven cases.

Cases ranged from 24 to 74 years of age; the median age was 41 years. Six (42%) cases were male, and 70% were non-Hispanic. 90% of patients reported having jaundice, fatigue, and dark urine while 70% of patients reporting having abdominal pain. Of the 9 patients for whom risk factor information was available, one (11%) reported injection drug use, one reported being incarcerated, two (22%) reported sexual exposure to a hepatitis B-positive person, two reported having intravenous infusions or injections in an outpatient setting.

Confirmed Cases: 10

Kansas incidence per 100,000 population (2013): 0.35
U.S. incidence per 100,000 population (2013): 0.97

Perinatal Hepatitis B

Clinical Criteria

- Perinatal hepatitis B in the newborn may range from asymptomatic to fulminant hepatitis.

Laboratory Criteria for Surveillance Purposes

- Hepatitis B surface antigen (HBsAg) positive.

Surveillance Case Definitions

- *Confirmed:* HBsAg positivity in any infant aged >1-24 months who was born in the United States or in U.S. territories to an HBsAg-positive mother.

Epidemiology and Trends

In 2013, one confirmed case of perinatal hepatitis B was reported in Kansas.

There were 76 babies born to hepatitis B-positive women in Kansas this year. Compared to 2012, Kansas experienced a 21% increase in the number of babies born to HBsAG-positive women. In 2013, all cases received the hepatitis B vaccine at birth. 27% of infants completed the three dose hepatitis B vaccine series; of these 71% followed up with a post vaccine serological test to ensure immunity had been conferred.

CHRONIC HEPATITIS B

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

- IgM antibodies to hepatitis B core antigen (IgM anti-HBc) negative AND a positive result on one of the following tests: hepatitis B surface antigen (HBsAg), hepatitis B e antigen (HBeAg), or hepatitis B virus (HBV) DNA, ***OR***
- HBsAg positive or HBV DNA positive or HBeAg positive two times at least 6 months apart (Any combination of these tests performed 6 months apart is acceptable.)

SURVEILLANCE CASE DEFINITIONS

- *Confirmed:* A case that meets either laboratory criteria for diagnosis

EPIDEMIOLOGY AND TRENDS

In 2013, 104 confirmed cases of chronic hepatitis B were reported.[1] Cases ranged from 12 to 78 years of age; the median age was 43 years. Race was reported for 86 (83%) of the cases; 60% of the cases were Asian, 22% of the cases were white, and 14% of the cases were black/African-American. Of the 61 patients for whom risk factor information was available, 5 (8%) reported injection drug use, 4 (7%) reported blood exposure, and 4 reported contact with another hepatitis B-positive patient.

Confirmed Cases: 104

Kansas incidence per 100,000 population (2013): 3.59
U.S. incidence per 100,000 population (2013): *NA*

[1] Chronic hepatitis B cases reported are those that were first reported to KDHE and confirmed in 2013 (e.g., the case had two positive laboratory results in 2013, 6 months apart).

HEPATITIS C

CLINICAL FEATURES: Initial infection may be asymptomatic or mild (<90% of cases); chronic infection is common (55% to 85% of cases). Approximately 70% of the chronically infected will develop chronic liver disease, cirrhosis or hepatocellular carcinoma. Liver function tests may be elevated or normal during chronic disease.

CAUSATIVE AGENT: The hepatitis C virus is an enveloped RNA virus in the Flavivirdae family.

MODE OF TRANSMISSION: Primarily as a bloodborne pathogen (e.g. sharing of contaminated objects especially needles and syringes) - transmission through sexual contact may also occur, although this is rare.

INCUBATION PERIOD: The incubation period ranges from 2 weeks to 6 months, averaging 6-9 weeks. Acute hepatitis C infection will convert to a chronic carrier state within 6 months if the acute infection does not resolve. Chronic infection may persist for 10 to 20 years prior to onset of symptoms.

PERIOD OF COMMUNICABILITY: Communicability persists as long as virus is present in the body. Chronic cases are considered infectious for life. Peaks in virus concentration correlate with peaks in ALT activity.

PUBLIC HEALTH SIGNIFICANCE: Preventative measures for hepatitis C include behavior modifications that also lower risk factors for acquiring other diseases, such as HIV. While no vaccine exists for hepatitis C, vaccination against hepatitis A and B are recommended for infected individuals.

REPORTABLE DISEASE IN KANSAS SINCE: 2000

ACUTE HEPATITIS C

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

One or more of the following three criteria:

- Antibodies to hepatitis C virus (anti-HCV) screening-test-positive with a signal to cut-off ratio predictive of a true positive as determined for the particular assay as defined by CDC. (URL for the signal to cut-off ratios: http://www.cdc.gov/ncidod/diseases/hepatitis/c/sc_ratios.htm), ***OR***

- Hepatitis C Virus Recombinant Immunoblot Assay (HCV RIBA) positive, ***OR***

- Nucleic Acid Test (NAT) for HCV RNA positive (including genotype)

AND, if done meets the following two criteria:

- IgM antibody to hepatitis A virus (IgM anti-HAV) negative, ***AND***

- IgM antibody to hepatitis B core antigen (IgM anti-HBc) negative

SURVEILLANCE CASE DEFINITIONS

Confirmed: a case that meets the clinical case definition, is laboratory confirmed, and is not known to have chronic hepatitis C.

EPIDEMIOLOGY AND TRENDS

Seventeen confirmed acute cases of hepatitis C were reported in Kansas in 2013. The ages of cases ranged from 19 to 65 years; the median age was 34 years. Race was reported for 16 (88%) cases, and the majority (83%) of cases were Caucasian. Risk factor information was available for 15 (83%) cases with complete risk factor information for 10 (56%). Fourteen (78%) cases had at least one risk factor. Of the fourteen cases for which information regarding injection drug use was available, nine (64%) reported injecting street drugs.

Confirmed Cases: 17

Kansas incidence per 100,000 population (2013): 0.59
U.S. incidence per 100,000 population (2013): 0.71

Past or Present Hepatitis C

Laboratory Criteria for Surveillance Purposes

One or more of the following three criteria:

- HCV RIBA (recombinant immunoblot assay) positive, ***OR***
- Nucleic Acid Test (NAT) positive for HCV RNA (including genotype), ***OR***
- Antibodies to hepatitis C virus (anti-HCV) screening-test-positive with a signal to cut-off ratio predictive of a true positive as determined for the particular assay and posted by CDC. (http://www.cdc.gov/ncidod/diseases/hepatitis/c/sc_ratios.htm)

Surveillance Case Definitions

Confirmed: a case that is laboratory confirmed and does not meet the case definition for acute hepatitis C.

Epidemiology and Trends

In 2013, 1,536 confirmed past or present hepatitis C cases were reported. Cases may represent prior unreported infections, individuals who were previously infected but have since cleared the infection, or asymptomatic newly infected individuals.

More infections were reported among males (68.2 per 100,000) than females (37.3 per 100,000).

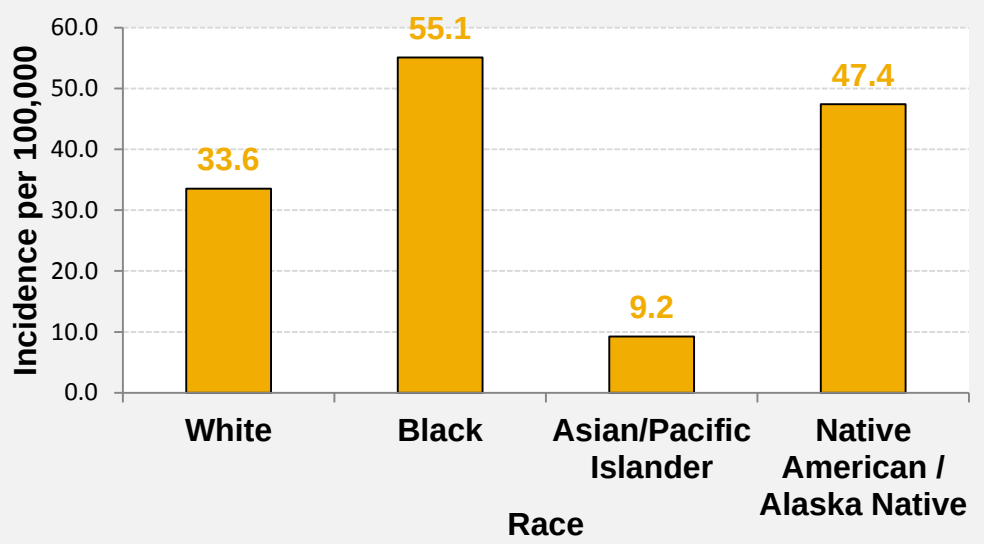
Race was not reported for 525 (34%) of the cases, and ethnicity was not reported for 556 (36%) of the cases. According to the race data that was collected, hepatitis C was most frequently reported for African-Americans (55.1 per 100,000) and Native Americans (47.4 per 100,000). Improved collection of race and ethnicity information is needed to more definitively describe the burden of chronic hepatitis C prevalence in Kansas.

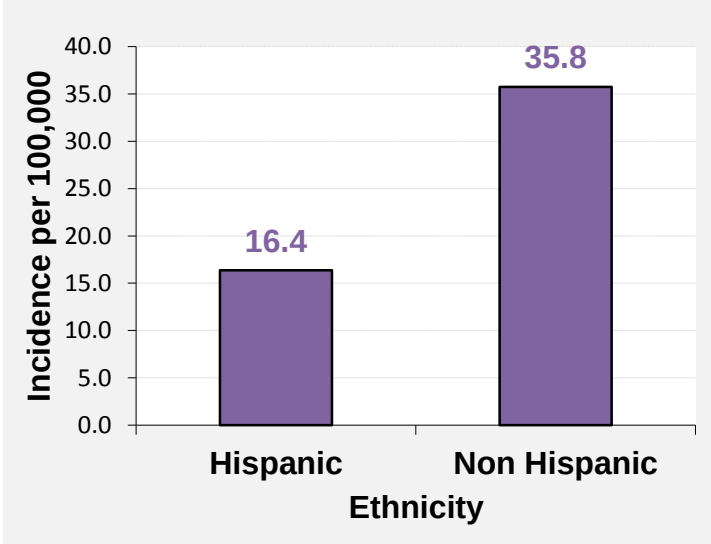
Chronic infections are not tracked nationally—no comparable U.S. rate is available.

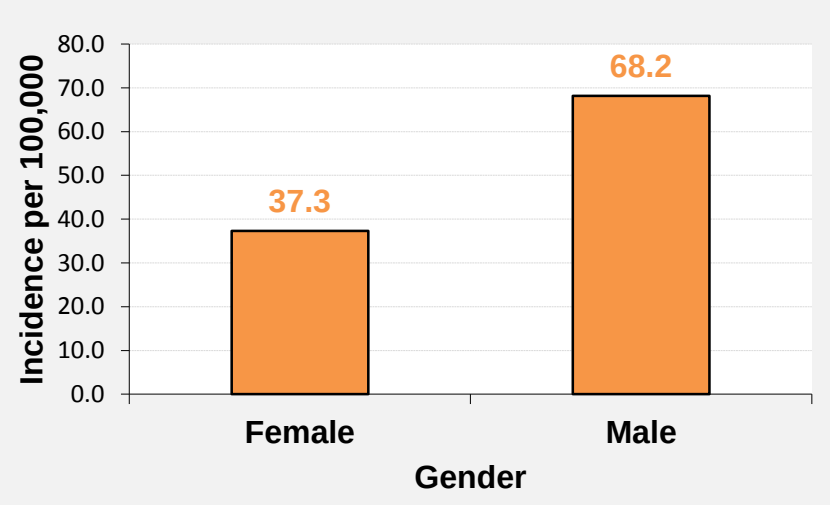
Confirmed Cases: 1,536

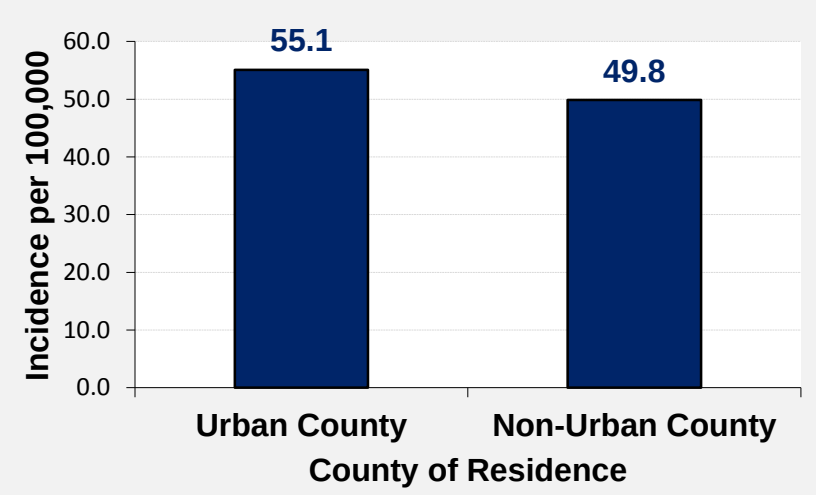
Kansas incidence per 100,000 population (2013): 52.80
U.S. incidence per 100,000 population (2013): *N/A*

Chronic hepatitis C incidence per 100,000 population, Kansas, 2013

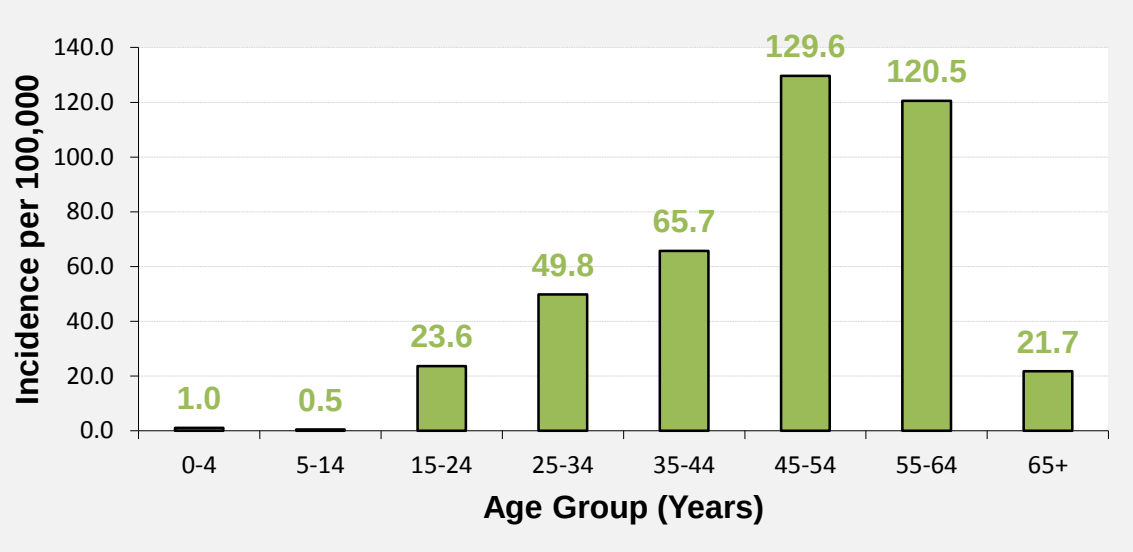




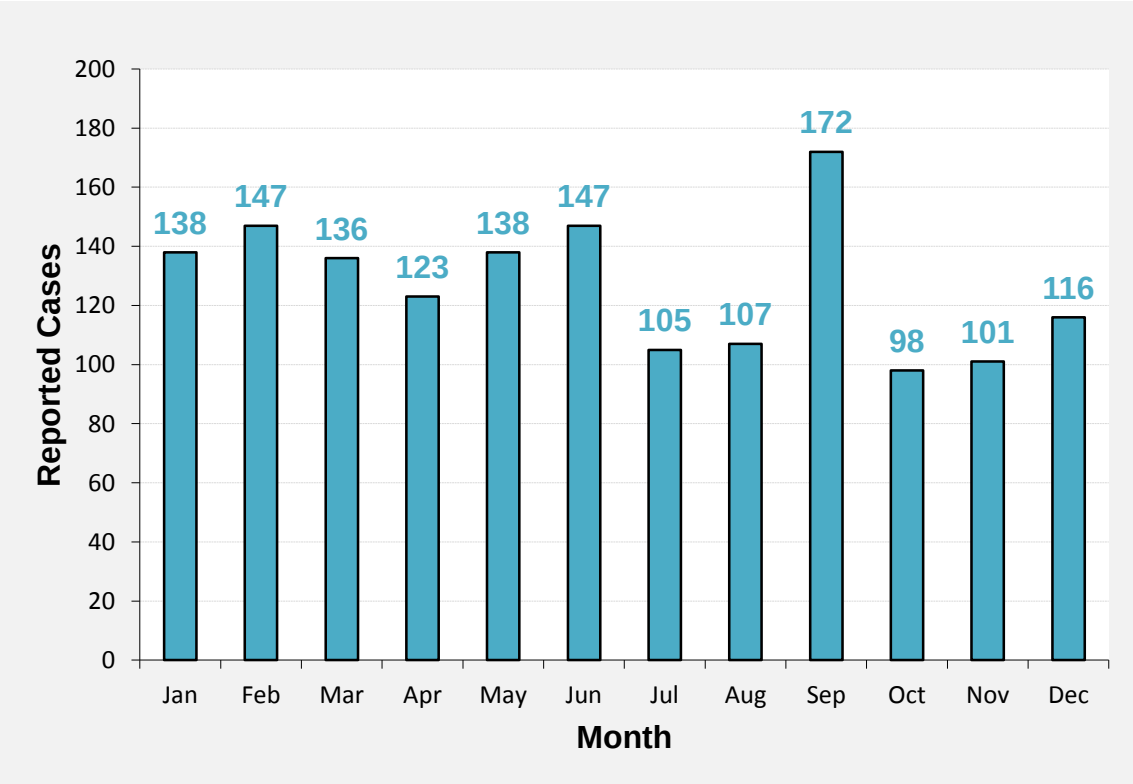




Chronic hepatitis C incidence per 100,000 population
Kansas, 2013



Chronic hepatitis C cases per month
Kansas, 2013



INFLUENZA-ASSOCIATED PEDIATRIC MORTALITY

CLINICAL FEATURES: Influenza is characterized by sudden onset of fever, cough, sore throat, and myalgia. Disease is usually mild, but complications, such as secondary bacterial pneumonia, may develop. Estimates of flu-associated deaths in the United States range from a low of about 3,00 to a high of about 49,000. Young children and adults over age 65 are at the highest risk for influenza-related complications and mortality.

CAUSATIVE AGENT: Influenza virus

MODE OF TRANSMISSION: Virus is transmitted from person to person by respiratory droplets, or indirectly through contact with contaminated objects or surfaces.

INCUBATION PERIOD: 1 to 4 days (average 2 days)

PERIOD OF COMMUNICABILITY: Cases may be infectious from one day prior to illness onset to 5 or more days after onset.

PUBLIC HEALTH SIGNIFICANCE: Influenza-associated pediatric deaths became nationally notifiable during the 2003-04 season, in response to several widely publicized cases, to further characterize those children at increased risk of influenza-related complications and deaths and to reassess current vaccination recommendations based on such information.

REPORTABLE DISEASE IN KANSAS SINCE: 2006

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

- Laboratory testing for influenza virus infection may be done on pre- or post-mortem clinical specimens, and include identification of influenza A or B virus infections by a positive result by at least one of the following:
  - Influenza virus isolation in tissue cell culture from respiratory specimens;
  - Reverse-transcriptase polymerase chain reaction (RT-PCR) testing of respiratory specimens;
  - Immunofluorescent antibody staining (direct or indirect) of respiratory specimens;
  - Rapid influenza diagnostic testing of respiratory specimens;
  - Immunohistochemical (IHC) staining for influenza viral antigens in respiratory tract tissue from autopsy specimens;

SURVEILLANCE CASE DEFINITIONS

- *Confirmed:* Death in a person less than 18 years of age with:
  - Pre or post-mortem laboratory confirmation of influenza virus infection, ***AND***
  - Clinically-compatible illness that does not fully resolve to baseline health status prior to death

EPIDEMIOLOGY AND TRENDS

Confirmed Cases: 1

Kansas incidence per 100,000 population (2013):	0.03
U.S. incidence per 100,000 population (2013):	0.22

One influenza-associated pediatric death was reported in Kansas during 2013.

LEGIONELLOSIS

CLINICAL FEATURES: Infection may result in either of two distinct illnesses: Legionnaires' disease, characterized by fever, myalgia, cough, and pneumonia, and Pontiac Fever, a milder form of the illness without pneumonia.

CAUSATIVE AGENT: *Legionella spp.*, gram-negative bacilli. *L. pneumophila* serogroup 1 is most commonly associated with disease.

MODE OF TRANSMISSION: Inhalation of contaminated aerosols from a soil or water source; other modes are possible, but have not been conclusively proven.

INCUBATION PERIOD: Ranges from 2-10 days. Pontiac Fever has a shorter average incubation period (1-2 days) compared to Legionnaires' disease (5-6 days).

PERIOD OF COMMUNICABILITY: Person-to-person spread has not been documented.

PUBLIC HEALTH SIGNIFICANCE: Legionellosis is an emerging infection that most frequently occurs in the elderly and the immunocompromised. Although most illnesses are sporadic, many outbreaks have been linked to contaminated water tanks, air conditioning cooling towers, evaporative condensers, and soil at excavation sites. Public health goals are outbreak identification and environmental remediation.

REPORTABLE DISEASE IN KANSAS SINCE: 1982

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

- *Suspect*:

  - By seroconversion: fourfold or greater rise in antibody titer to specific species or serogroups of *Legionella* other than *L. pneumophila* serogroup 1 (e.g., *L. micdadei*, *L. pneumophila* serogroup 6) , ***OR***
  - By seroconversion: fourfold or greater rise in antibody titer to multiple species of *Legionella* using pooled antigen and validated reagents, ***OR***
  - By the detection of specific *Legionella* antigen or staining of the organism in respiratory secretions, lung tissue, or pleural fluid by direct fluorescent antibody (DFA) staining, immunohistochemstry (IHC), or other similar method, using validated reagents, ***OR***
  - By detection of *Legionella* species by a validated nucleic acid assay.

- *Confirmed*:

  - By culture: isolation of any *Legionella* organism from respiratory secretions, lung tissue, pleural fluid, or other normally sterile fluid, ***OR***
  - By detection of *Legionella pneumophila* serogroup 1 antigen in urine using validated reagents, ***OR***
  - By seroconversion: fourfold or greater rise in specific serum antibody titer to *Legionella pneumophila* serogroup 1 using validated reagents.

SURVEILLANCE CASE DEFINITIONS

- *Suspect*: a clinically compatible case that meets at least one of the presumptive (suspect) laboratory criteria.

- *Confirmed:* A clinically compatible case that meets at least one of the confirmatory laboratory criteria.

EPIDEMIOLOGY AND TRENDS

In 2013, eighteen confirmed cases of legionellosis were reported in Kansas. The three-year median for 2010-2012 was 14 cases. Cases ranged from 43 to 91 years of age; the median age was 66.5 years. Older adults were more often affected, with 16 (89%) of cases occurring among individuals 55 years of age and older. Sixteen cases were hospitalized and there was one reported death.

Confirmed Cases: 18

Kansas incidence per 100,000 population (2013): 0.62
U.S. incidence per 100,000 population (2013): 1.58

LISTERIOSIS

CLINICAL FEATURES: Symptoms vary and are dependent on the individual affected. Neonates, elderly, immunocompromised individuals, and pregnant women are at highest risk. Symptoms include fever, malaise, headache, nausea, vomiting, meningitis, septicemia, delirium, and coma. On rare occasion, symptoms may include endocarditis, granulomatous lesions in the liver and other organs, localized internal or external abscesses, and pustular or papular cutaneous lesion. In pregnant women, infection can be transmitted to the fetus, and infants may be stillborn, born with septicemia, or develop meningitis in the neonatal period - even though the mother may be asymptomatic at delivery.

CAUSATIVE AGENT: *Listeria monocytogenes*, a gram-positive bacterium.

MODE OF TRANSMISSION: Ingestion of raw or contaminated milk, soft cheeses, vegetables, pate, unwashed raw vegetables, and ready to eat meats, such as deli meat and hot dogs. Direct contact with infected materials may lead to pupular lesions on hands and arms. In utero transmission from mother to fetus may occur; transmission during passage through the infected birth canal is also possible. The principal reservoir of *Listeria monocytogenes* is in soil, forage, water, mud and silage. Other reservoirs include infected domestic and wild mammals, fowl, and people. Asymptomatic fecal carriage is common in humans.

INCUBATION PERIOD: Ranges from 3-70 days (average 3 weeks).

PERIOD OF COMMUNICABILITY: Mothers of infected newborn infants can shed the infectious agent in vaginal discharges and urine for 7-10 days after delivery, rarely longer. However, infected individuals can shed the organisms in their stool for several months.

PUBLIC HEALTH SIGNIFICANCE: Pregnant women, fetuses and newborns infants are highly susceptible. The postpartum course of the mother is usually uneventful, but the case fatality rate is 30% in newborn infants and approaches 50% when onset occurs in the first 4 days. Severe disease in adults, including pregnant women, associated with contaminated food emphasized that older children and adults can have systemic disease with mortality. Listeriosis is often associated with contaminated food products. A product recall may be issued if *Listeria* contamination is suspected.

REPORTABLE DISEASE IN KANSAS SINCE: 2000

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

- Isolation of *L. monocytogenes* from a normally sterile site (e.g., blood or cerebrospinal fluid [CSF] or, less commonly, joint, pleural, or pericardial fluid), ***OR***
- In the setting of miscarriage or stillbirth, isolation of L. monocytogenes from placental or fetal tissues.

SURVEILLANCE CASE DEFINITIONS

- *Confirmed:* A clinically compatible case that is laboratory confirmed.

- *Probable:* A clinically compatible case that is epidemiologically linked to a confirmed case.

EPIDEMIOLOGY AND TRENDS

Three confirmed cases of listeriosis were reported in Kansas in 2013. The three-year median for 2010-2012 was seven cases. All three cases were hospitalized; no cases were associated with pregnancy and no deaths were reported.

Confirmed Cases: 3

Kansas incidence per 100,000 population (2013): 0.10
U.S. incidence per 100,000 population (2013): 0.23

LYME DISEASE

CLINICAL FEATURES: A systemic, tick-borne disease, almost never fatal, with manifestations affecting skin, nervous system, heart and/or joints. In early stages, 60%-80% of patients present with a characteristic "bull's-eye" rash, erythema migrans (EM), accompanied by nonspecific symptoms such as fever, malaise, fatigue, headache, myalgia, and arthralgia. If untreated, some patients may develop arthritis; neurologic abnormalities, such as aseptic meningitis, facial palsy, nerve inflammation and encephalitis; and cardiac problems.

CAUSATIVE AGENT: *Borrelia burgdorferi*, a spirochete bacterium

MODE OF TRANSMISSION: Maintained in the blood and tissues of small rodents and deer, the organism is transmitted by blood to feeding ticks, specifically the *Ixode*s species including the deer tick (*I. scapularis*) and the western black-legged tick (*I. pacificus*). During its feeding process, the infected tick will transmit the organism to humans and other mammals. Transmission occurs after $\geq$24 hours of tick attachment.

INCUBATION PERIOD: After tick exposure, 3-32 days, with an average of 7-10 days.

PERIOD OF COMMUNICABILITY: Person-to-person transmission has not been documented.

PUBLIC HEALTH SIGNIFICANCE: A vaccine against Lyme disease was available in 2001, but has since been withdrawn by the manufacturer. The role of the health department is limited to providing education on the mode of tick transmission and means of personal protection.

REPORTABLE DISEASE IN KANSAS SINCE: 1990

EPIDEMIOLOGY AND TRENDS

Confirmed and Probable Cases: 34

Kansas incidence per 100,000 population (2013):	1.17
U.S. incidence per 100,000 population (2013):	11.62

In 2013, thirty-four cases of Lyme disease (18 confirmed and 16 probable) were reported in Kansas. Eighteen (51%) cases were female. The median age of cases was 36.5 years with a range of 4 to 70 years.

Known exposure histories were documented for all confirmed and fifteen (94%) probable cases. Nine (50%) confirmed cases and fourteen (88%) probable cases reported exposure inside the state of Kansas.

MALARIA

CLINICAL FEATURES: The symptoms of malaria include high fever, chills, rigor, and headache, which may be recurrent and suddenly. If untreated, fever and other symptoms may occur in a cyclical pattern every second or third day. Other commonly associated symptoms include back pain, sweats, myalgia, nausea, vomiting, diarrhea, and cough. Untreated *Plasmodium falciparum* infection can lead to coma, renal failure, pulmonary edema, and death. The diagnosis of malaria should be considered for any person who has these symptoms and who has traveled to an area in which malaria is endemic. Asymptomatic parasitemia can occur among persons who have been long-term residents of areas in which malaria is endemic.

CAUSATIVE AGENT: *Plasmodium vivax, P. ovale, P. malaria,* or *P. falciparum*

MODE OF TRANSMISSION: By the bite of an infective female *Anopheles spp.* mosquito. Most species feed at dusk and during early night hours; some important vectors have biting peaks around midnight or early hours of morning. Malaria may also be transmitted by injection or transfusion of blood of infected persons or by use of contaminated needles or syringes, as by drug users. Humans are the only important reservoir of human malaria.

INCUBATION PERIOD: The time between the infective bite and the appearance of clinical symptoms is approximately 9 to 14 days for *P. falciparum*, 12 to 18 days for *P. vivax* and *P. ovale*, and 18 to 40 days for *P. malariae*.

PERIOD OF COMMUNICABILITY: *Plasmodium* may be passed on to biting mosquitoes as long as infective gametocytes are present in human blood; this varies from one to five years depending on the parasite species and response to treatment. The mosquito remains infective for life. Transmission by transfusion may occur as long as asexual forms remain in the circulating blood, up to 40 years. Stored blood can remain infective for at least one month.

PUBLIC HEALTH SIGNIFICANCE: Although malaria is not endemic to the United States or Kansas, it remains a public health threat for several reasons: (1) most persons have no protective immunity and can develop a rapid severe disease, (2) malaria cases can transmit the parasites to local mosquitoes, which in turn can pass it onto local residents. Cases of malaria in Kansas have been reported among individuals with history of foreign travel. Persons traveling to areas at high risk for malaria can protect themselves by taking effective antimalarial drugs and following measures to prevent mosquito bites.

REPORTABLE DISEASE IN KANSAS SINCE: 1982

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

- Confirmed infection:
  - Detection of circulating malaria-specific antigens using rapid diagnostic test (RDT), ***OR***
  - Detection of species specific parasite DNA in a sample of peripheral blood using a Polymerase Chain Reaction (PCR) test, ***OR***

- Detection of malaria parasites in thick or thin peripheral blood films.

SURVEILLANCE CASE DEFINITIONS

- *Confirmed:*
  - Detection and specific identification of malaria parasite species by microscopy on blood films in a laboratory with appropriate expertise in any person (symptomatic or asymptomatic) diagnosed in the United States, regardless of whether the person experienced previous episodes of malaria while outside the country, ***OR***
  - Detection of *Plasmodium* species by nucleic acid test in any person (symptomatic or asymptomatic) diagnosed in the United States, regardless of whether the person experienced previous episodes of malaria while outside the country.
- *Suspect:* Detection of *Plasmodium* species by rapid diagnostic antigen testing without confirmation by microscopy or nucleic acid testing in any person (symptomatic or asymptomatic) diagnosed in the United States, regardless of whether the person experienced previous episodes of malaria while outside the country.

EPIDEMIOLOGY AND TRENDS

In 2013, eight confirmed cases of malaria were reported in Kansas. No deaths were reported; however, six cases were hospitalized. The cases ranged from 19 to 58 years of age, with a median age of 46 years. Six (75%) cases were male. Four cases were infected with *Plasmodium falciparum*, two were infected with *P. malariae*, one was infected with *P. vivax*, and one malaria species was never definitively determined, but it most closely resembled *P. vivax/P. ovale*.

All cases reported travel to or from malaria-endemic regions: Africa (6), and India (2). Information regarding malaria chemoprophylaxis was known for all cases: four did not receive chemoprophylaxis; four received chemoprophylaxis, but three did not take the drugs as indicated; and it is unknown for one case whether or not drugs were taken as indicated.

Confirmed Cases: 8

Kansas incidence per 100,000 population (2013): 0.28
U.S. incidence per 100,000 population (2013): 0.51

MENINGITIS, OTHER BACTERIAL

(non-meningococcal and non-*Haemophilus influenzae* type B)

CLINICAL FEATURES: May include fever, headache, stiff neck, vomiting, and rash.

CAUSATIVE AGENT: For the purposes of this document, "other" bacterial meningitis is defined as an infection of the meninges caused by bacteria other than *Neisseria meningitidis* or *Haemophilus influenzae* type B.

MODE OF TRANSMISSION: Direct person-to-person contact, including respiratory droplets from the nose or throat of infected individuals.

INCUBATION PERIOD: ranges from 2 to 10 days

PERIOD OF COMMUNICABILITY: Untreated patients are most infectious for 2-3 weeks after the illness onset, although transmission may occur until the bacteria are no longer found in respiratory secretions.

PUBLIC HEALTH SIGNIFICANCE: Meningitis caused by *Streptococcus pneumoniae* may be prevented through vaccination. Contacts of non-meningococcal and non-HiB meningitis normally do not require post-exposure prophylaxis.

REPORTABLE DISEASE IN KANSAS SINCE: 1982

EPIDEMIOLOGY AND TRENDS

Confirmed Cases: 4

Kansas incidence per 100,000 population (2013): 0.14
U.S. incidence per 100,000 population (2013): *N/A*

In 2013, there were four reported confirmed cases of non-meningococcal, non-*Haemophilus influenza*e type B bacterial meningitis. Causative agents were identified for all four cases: three were caused by *Staphylococcus* spp. (3), and one was caused by *Streptococcus viridans*. Cases ranged from 16 to 66 years of age, with a median age of 58.5 years. All were hospitalized and no deaths were reported.

MENINGOCOCCAL DISEASE

CLINICAL FEATURES: The disease manifests most commonly as meningitis and/or meningococcemia that may progress rapidly to purpura fulminant, shock, and death. The disease is characterized by sudden onset with fever, intense headache, nausea (often with vomiting), and stiff neck. Up to 15% of the population may carry *N. meningitidis* in the nasopharynx without developing invasive disease, while a few develop bacteremia, sepsis, meningitis, or pneumonia. Even with early diagnosis and appropriate treatment, the fatality rate of meningococcal meningitis is 5-15%.

CAUSATIVE AGENT: Meningococcal disease is an acute bacterial disease caused by *Neisseria meningitidis*, a gram-negative, diplococcus bacterium. The most common serogroups of *N. meningitidis* in the United States are B, C, W-135, and Y.

MODE OF TRANSMISSION: Transmission of *N. meningitidis* is from person to person by direct contact with respiratory droplets from the nose and throat of infected individuals. Late winter to early spring is the peak season for infection, but infections can occur at any time of the year. Humans are the reservoir.

INCUBATION PERIOD: The incubation period is usually three or four days, but may range from two to 10 days.

PERIOD OF COMMUNICABILITY: Individuals are communicable until meningococci are no longer present in the discharges from the nose and mouth. Meningococci usually disappear from the nasopharynx within 24 hours after the institution of appropriate therapy. Penicillin will temporarily suppress the organisms, but will not eradicate them.

PUBLIC HEALTH SIGNIFICANCE: Vaccination and post-exposure prophylaxis are effective in preventing meningococcemia. Vaccines are available to prevent disease caused by types A, C, Y, and W-135. There is no vaccine for serogroup B, historically responsible for 20-30% of reported cases in Kansas. Chemoprophylaxis is used for close contacts of cases (e.g., household members, intimate contacts, health care personnel performing mouth-to-mouth resuscitation, day care center playmates). No chemoprophylaxis is recommended for less intimate contacts (e.g., school classmates, health care workers with minimal contact, etc.) except during an outbreak or in a child care center.

REPORTABLE DISEASE IN KANSAS SINCE: 1982

SURVEILLANCE CASE DEFINITIONS

- *Confirmed:* Isolation of *Neisseria meningitidis*
  - From a normally sterile body site (e.g., blood or cerebrospinal fluid, or, less commonly, synovial, pleural, or pericardial fluid), ***OR***
  - From purpuric lesions.

- *Probable:*

- Detection of *N. meningitidis*-specific nucleic acid in a specimen obtained from a normally sterile body site (e.g.,. blood or CSF), using a validated polymerase chain reaction (PCR) assay; ***OR***
- Detection of *N. meningitidis* antigen
  - In formalin-fixed tissue by immunohistochemistry (IHC); ***OR***
  - In CSF by latex agglutination.

➢ *Suspect:*

- Clinical purpura fulminans in the absence of a positive blood culture; ***OR***
- Gram-negative diplococci, not yet identified, isolated from a normally sterile body site (e.g., blood or CSF).

EPIDEMIOLOGY AND TRENDS

Three confirmed cases of meningococcal disease were reported in Kansas during 2013. Cases ranged in age from 22 to 65 years of age. The three-year median for 2010-2012 was 5 cases.

All three *Neisseria* isolates were forwarded to the state laboratory for serogrouping. Two vaccine-preventable group Y isolates were identified and one vaccine-preventable group W-135 isolate was identified (Table 1). The meningococcal vaccine does not protect against Group B *Neisseria*. Vaccination history against meningococcal disease was unknown for all three cases.

Table 1: Reported *Neisseria meningitidis* serogroups – Kansas, 2005-2013

Year	Cases	Isolates Serogrouped	B	C	Y	W-135
2013	3	3	0	0	2	1
2012	6	5	1	0	2	2
2011	5	4	1	0	3	0
2010	8	7	5	1	1	0
2009	13	6	1	2	3	0
2008	8	5	2	2	1	0
2007	10	7	3	0	1	1
2006	4	3	1	1	1	0
2005	11	11	6	1	4	0

Confirmed Cases: 3

Kansas incidence per 100,000 population (2013): 0.10
U.S. incidence per 100,000 population (2013): 0.18

PERTUSSIS (WHOOPING COUGH)

CLINICAL FEATURES: A prolonged, paroxysmal cough with characteristic inspiratory "whoop" is the primary symptom; post-tussive vomiting may also occur. Infants may present with apnea or cyanosis, while adults may present only with a chronic spasmodic cough.

CAUSATIVE AGENT: *Bordetella pertussis*, a bacillus bacterium.

MODE OF TRANSMISSION: Contact with respiratory secretions of infected persons.

INCUBATION PERIOD: Ranges from 4-21 days (average 7-10 days).

PERIOD OF COMMUNICABILITY: Most transmissible in the period before cough becomes paroxysmal. Communicability gradually decreases and becomes negligible after three weeks. Patients are considered infectious until five days after beginning treatment.

PUBLIC HEALTH SIGNIFICANCE: Pertussis affects all age groups, but the disease is most severe in infants and young children. A vaccine exists to prevent illness in this age group (i.e., children under seven years old). In addition, a booster vaccine is licensed for those ≥11 years of age (including individuals 65 years and older).

REPORTABLE DISEASE IN KANSAS SINCE: 1982

SURVEILLANCE CASE DEFINITIONS

- *Confirmed:*
  - Acute cough illness of any duration, with isolation of *B. pertussis* from a clinical specimen; ***OR***
  - Cough illness lasting ≥2 weeks, with at least one of the following symptoms:
    - paroxysms of coughing; ***OR***
    - inspiratory "whoop"; ***OR***
    - post-tussive vomiting; ***AND***
    - polymerase chain reaction (PCR) positive for pertussis; ***OR***
  - Illness lasting ≥2 weeks, with at least one of the following symptoms:
    - paroxysms of coughing; ***OR***
    - inspiratory "whoop"; ***OR***
    - post-tussive vomiting; ***AND***
    - contact with a laboratory-confirmed case of pertussis.

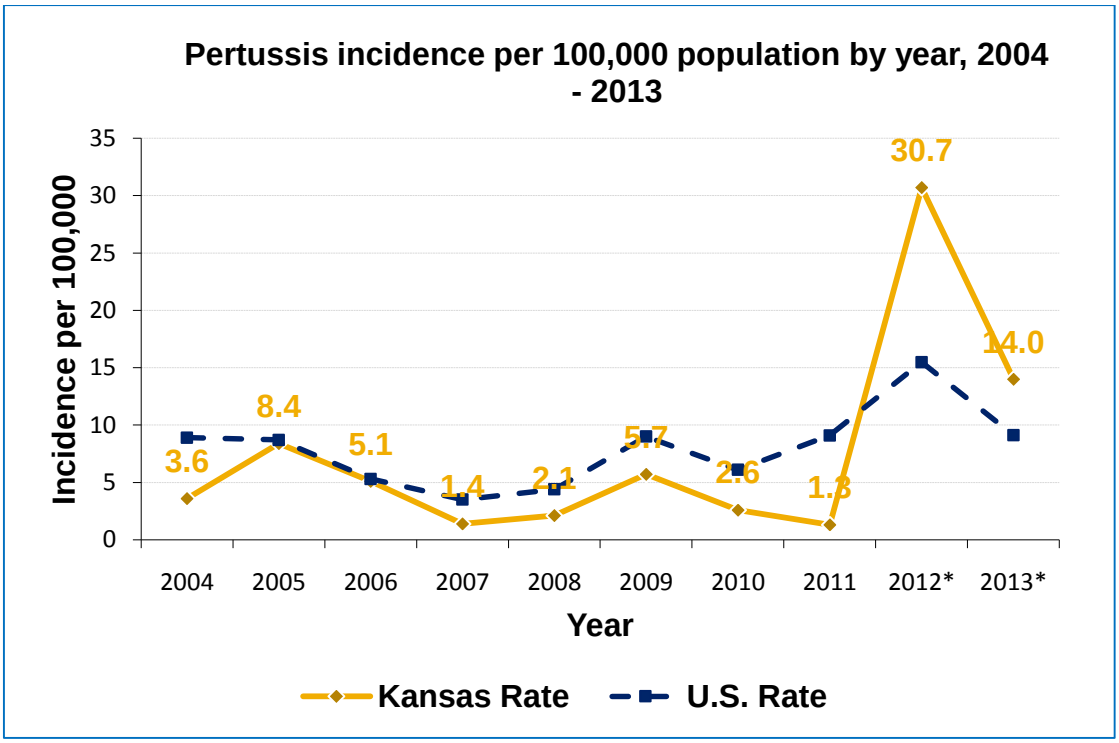
- *Probable:* In the absence of a more likely diagnosis, a cough illness lasting ≥2 weeks, with at least one of the following symptoms:
  - paroxysms of coughing; ***OR***
  - inspiratory "whoop"; ***OR***
  - post-tussive vomiting; ***AND***
  - absence of laboratory confirmation; ***AND***

- no epidemiologic linkage to a laboratory-confirmed case of pertussis.

EPIDEMIOLOGY AND TRENDS

Confirmed and Probable Cases: 405

Kansas incidence per 100,000 population (2013): 13.99
U.S. incidence per 100,000 population (2013): 9.12



**** Kansas incidence includes confirmed and probable cases***

In 2013, 405 cases (279 confirmed and 126 probable) of pertussis were reported in Kansas. Cases ranged in age from one month old to 82 years; the median age was 12 years. The incidence was highest (41.9 per 100,000) among children 5-14 years of age followed by children 0-4 years of age with 35.4 per 100,000 population.

All persons reported a cough illness (Table 1). Duration of cough was reported by 98% (396/405) of cases and ranged from 5 to 162 days (median, 21 days). Of those that reported duration of cough, 99% had a cough lasting at least two weeks.

Table 1: Symptoms reported among persons with pertussis, Kansas, 2013

Symptom	# of Cases with Symptoms	# of Cases with Information (%)
Cough	405	405 (100%)
Paroxysms	376	403 (93%)
Whoop	100	405 (25%)
Post-tussive vomiting	173	402 (43%)

There were 239 cases tested for pertussis by PCR and 223 (93%) were positive. Twenty cases were tested by culture and 18 (90%) were positive.

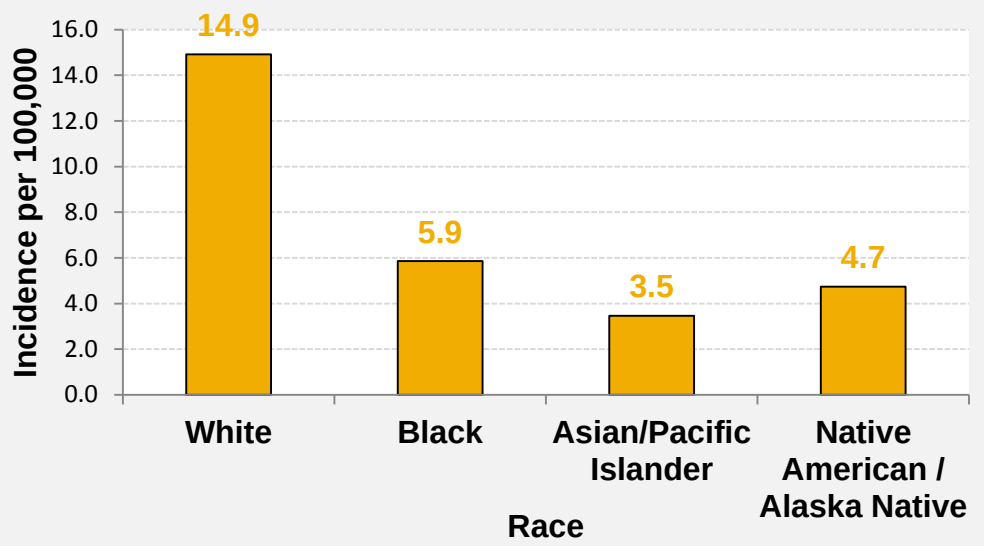
Thirty-six percent of cases were completely unvaccinated against pertussis (Table 2).

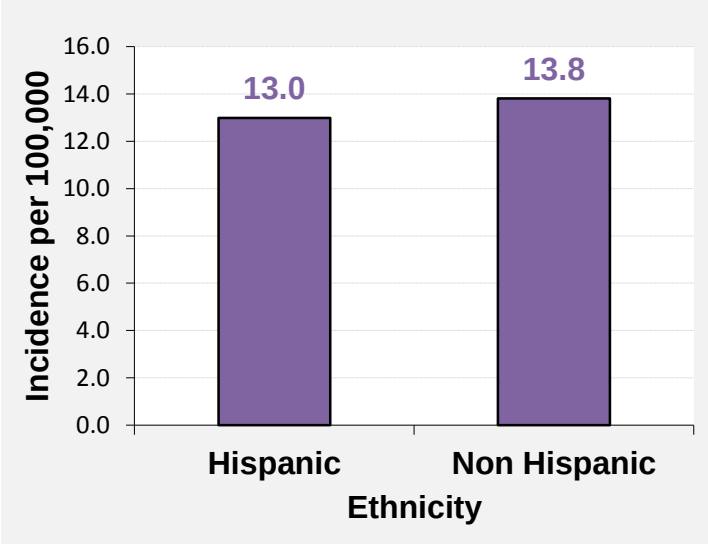
Table 2: Vaccination status of persons with pertussis by age group, Kansas, 2013

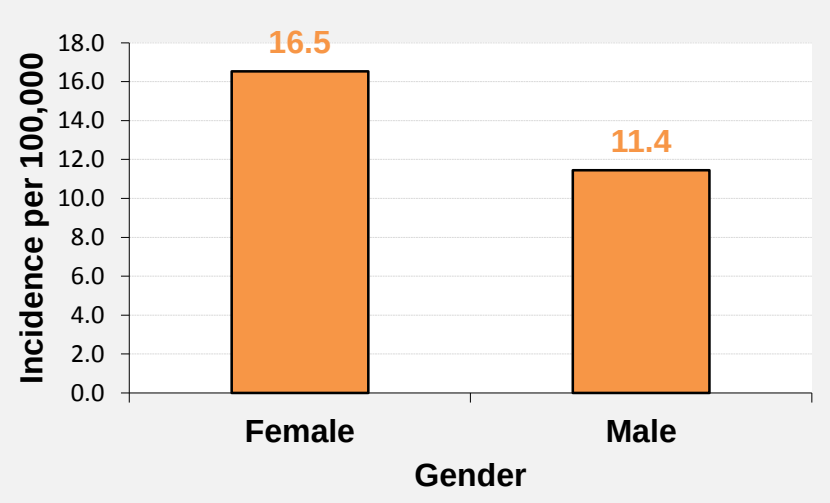
Age Group	# of Cases	# of Unvaccinated Cases (%)
<6 months	24	12 (50%)
6 to 11 months	5	3 (60%)
1 to 4 years	42	12 (29%)
5 to 9 years	70	14 (20%)
10 to 14 years	100	4 (4%)
15 to 19 years	43	4 (9%)
≥20 years	120	97 (81%)

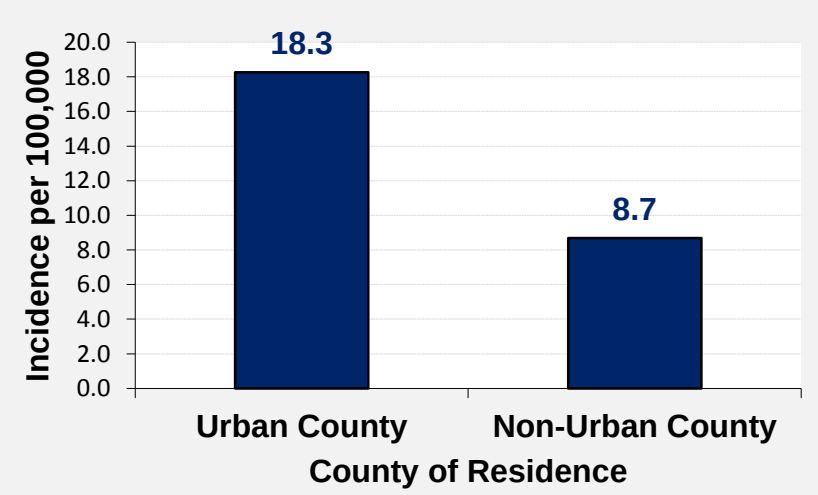
Fifty-nine cases were linked to eleven individual outbreaks in Finney, Johnson, Leavenworth, Pawnee, Stafford, and Sedgwick counties. Incidence was highest in these counties (Figure 1).

Pertussis incidence per 100,000 population, Kansas, 2013

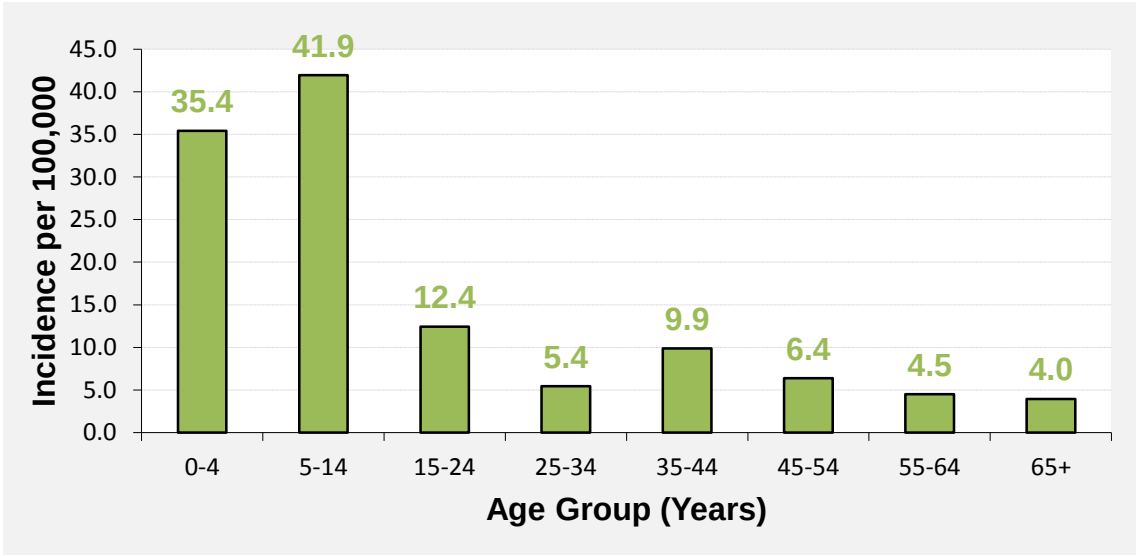








Pertussis incidence per 100,000 population
Kansas, 2013



Pertussis cases per month
Kansas, 2013

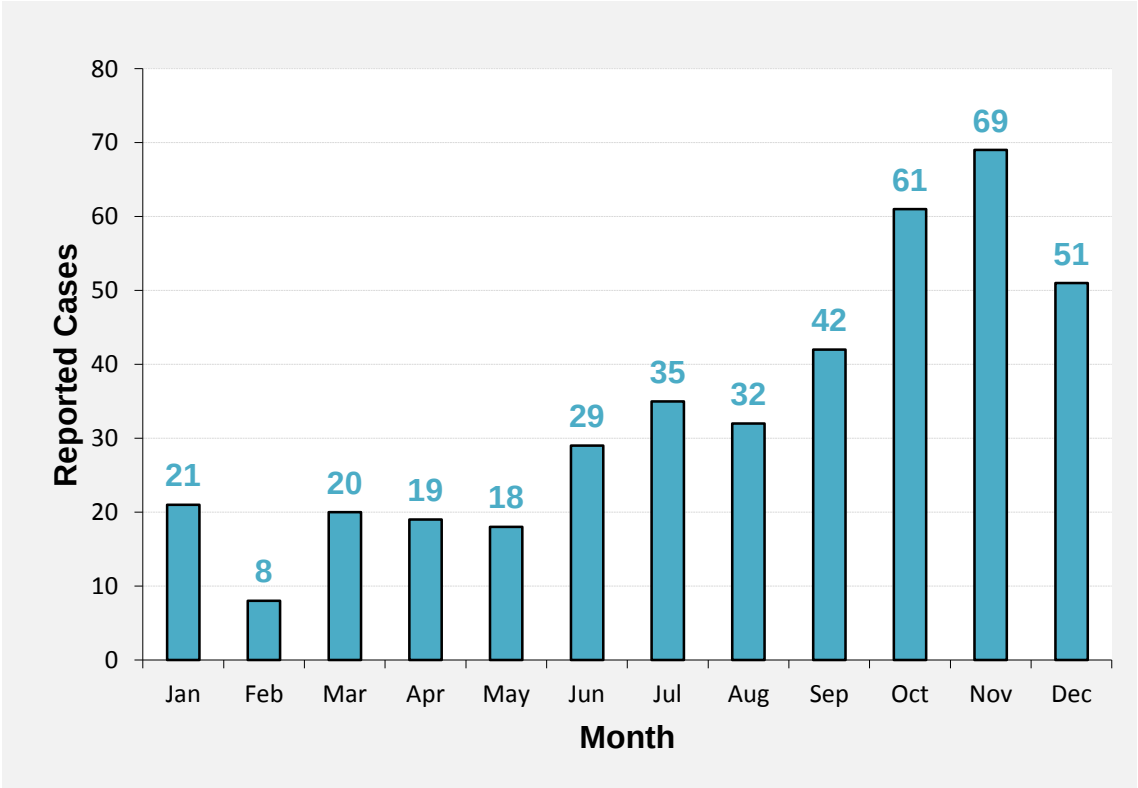
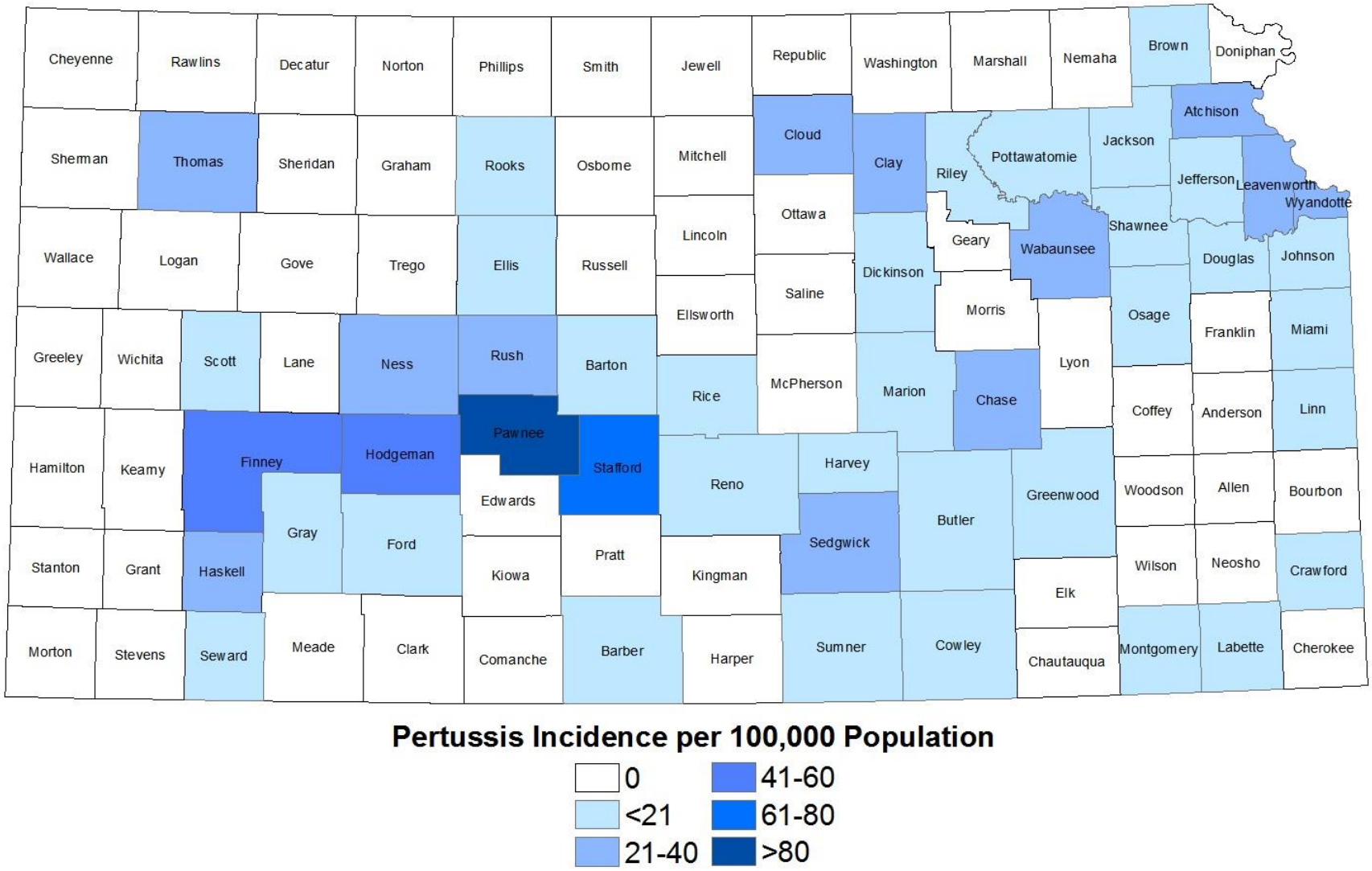


Figure 3: Incidence of pertussis per 100,000 population by county, Kansas, 2013



Q FEVER

CLINICAL FEATURES: The onset may be sudden with chills, retrobulbar headache, weakness, malaise and severe sweats. There is considerable variation in the severity and duration of symptoms; however, acute Q fever usually lasts 1 to 4 weeks. Infections may be inapparent or present as "fever of unknown origin". A pneumonitis is found on x-ray in some cases but without the cough, chest pain, sputum production, or physical findings typical of most pneumonias. Elevated liver enzymes are common and complications can include acute and chronic granulomatous hepatitis. Chronic Q fever can manifest as endocarditis with a prolonged course lasting for years and lead to the destruction of native heart valves necessitating valve replacement. Rare clinical syndromes, including neurologic complications, have been described.

CAUSATIVE AGENT: *Coxiella burnetii*, an intracellular, rickettsial bacterium

MODE OF TRANSMISSION: The most common reservoirs are domestic farm animals, especially sheep, goats, and cows. Cats, dogs, rodents, marsupials, other mammalian species, and some wild and domestic bird species may also transmit infection to humans. Tick vectors may be important for maintaining animal and bird reservoirs, but are not thought to be important in transmission to humans. Humans typically acquire infection by inhalation of *C. burnetii* in fine-particle aerosols generated from birthing fluids during animal parturition or through inhalation of dust contaminated by these materials.

INCUBATION PERIOD: Can vary from 9 to 39 days but is usually 14 to 22 days.

PERIOD OF COMMUNICABILITY: Direct transmission from person to person rarely if ever occurs. However, contaminated clothing may be a source of infection.

PUBLIC HEALTH SIGNIFICANCE: The organism responsible for Q fever is a potential bioterrorist agent. Special safety practices are recommended for laboratory procedures and research facilities involving *Coxiella burnettii.* Strict adherence to proper hygiene when handling parturient animals can help decrease the risk of infection in the farm setting.

REPORTABLE DISEASE IN KANSAS SINCE: 2000

EPIDEMIOLOGY AND TRENDS

Confirmed and Probable Cases: 4

Kansas incidence per 100,000 population (2013):	0.14
U.S. incidence per 100,000 population (2013):	0.04

Four cases of Q fever (three probable, acute cases and one probable, chronic case) were reported in Kansas during 2013. Since Q fever became a reportable disease in 2001, zero to two

confirmed cases have been reported annually. 2012 was the first year that probable cases have been reported with confirmed in the annual summary.

Exposure risks were available for three cases. One acute case reported exposure to agriculture, while a chronic case and an acute case reported international travel.

RABIES, ANIMAL

CLINICAL FEATURES: Rabies virus infects the central nervous system causing encephalopathy and death. This infection can cause a variety of clinical signs in animals. Often people will refer to 'furious' rabies or 'dumb' rabies. Animals with encephalitic, or furious rabies, are very aggressive, bite objects and other animals or people. Animals with paralytic or (dumb) rabies may be timid and shy. They often reject food and water due to paralysis of the lower jaw and muscles. Signs of animal rabies include: changes in behavior, general sickness, problems swallowing, an increase in saliva (e.g. foaming at the mouth), wild animals appearing abnormally tame or sick, animals that bite at everything if excited, difficulty moving or paralysis and, death.

CAUSATIVE AGENT: Lyssavirus

MODE OF TRANSMISSION: Wild mammals are the most important source of infection for both humans and animals in the United States. Skunks are the main reservoir for rabies in Kansas; rabies is considered endemic in all counties in Kansas. Transmission occurs through bite and non-bite exposures. Bite exposures occur when the skin is punctured by teeth; virus particles may reach a nerve and cause infection. A non-bite exposure occurs when an open wound, scratch, abrasion, or intact mucous membrane (e.g. inside of mouth, eyelids) is contaminated with the saliva, brain material, or cerebrospinal fluid from a rabid animal; a scratch from a rabid animal is also considered a non-bite exposure.

INCUBATION PERIOD: In animals, generally 15-50 days, but variable and in rare cases even several months or longer.

PERIOD OF COMMUNICABILITY: In dogs, cats, and ferrets, rabies is communicable 10 days before the onset of clinical signs, and throughout the illness until death. The period of communicability in other species is unknown.

PUBLIC HEALTH SIGNIFICANCE: Rabies infection in both animals and people is fatal. People that have been bitten by a known or suspected rabid animal should receive rabies post-exposure prophylaxis (PEP) as soon as possible. Investigation of confirmed animal rabies cases and unsuitable rabies specimens represents a significant burden for local health departments in Kansas. Public health officials conduct an exposure risk assessment for each human contact to provide recommendations for PEP and for each animal contact to determine the need for observation or quarantine.

REPORTABLE DISEASE IN KANSAS SINCE: 1982

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

- Positive direct fluorescent antibody test (preferably performed on central nervous system tissue), ***OR***
- Isolation of rabies virus in cell culture or in a laboratory animal

SURVEILLANCE CASE DEFINITIONS

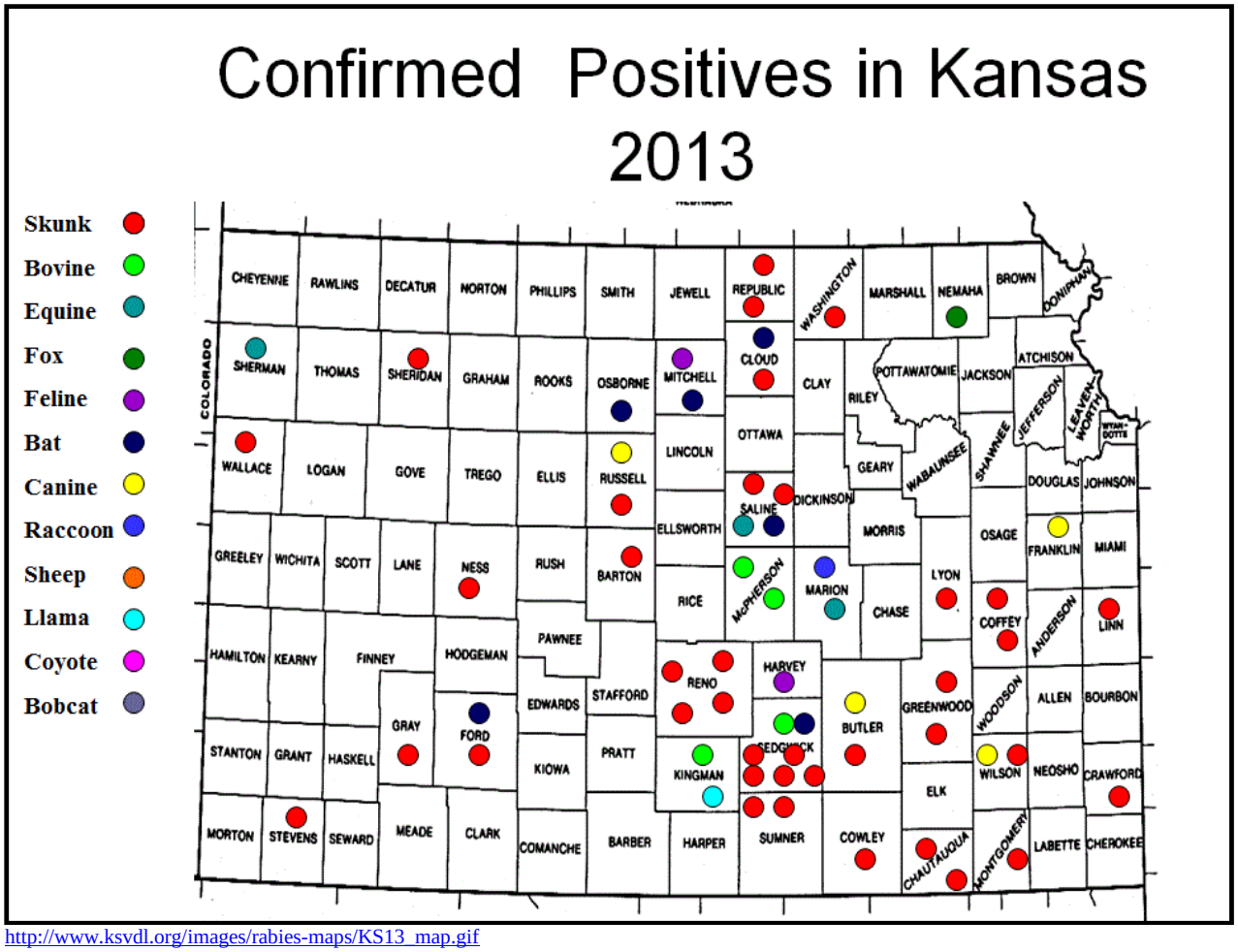
- *Confirmed:* a case that is laboratory confirmed.

EPIDEMIOLOGY AND TRENDS

Confirmed Cases: 60

In Kansas, 60 laboratory-confirmed cases of rabies in animals were reported in 34 different counties during 2013 (Figure 1). The three-year median for 2010-2012 was 56 cases. Confirmed cases per year may not represent an actual change in rabies prevalence, but rather a change in the number of animal-to-animal or animal-to-human exposures. In Kansas, animals are not usually tested unless an exposure has occurred. In 2013, 5.4% of all animal submissions tested positive for rabies; the three-year median for 2010-2012 was 4.4%. Among animals that were commonly tested (i.e., cats, dogs, cows, horses, bats, raccoons, skunks), skunks tested positive most frequently (Table 1). The number of animals submitted for testing and the number of rabies-positive animals tend to follow the cyclical pattern of the skunk population in the state.

Figure 4: Rabies-positive animal species by county



http://www.ksvdl.org/images/rabies-maps/KS13_map.gif

Table 3: Animal rabies testing by species, Kansas, 2013

	Species	# Tested	# Positive	% Positive
Domestic	Cat	378	2	1%
	Cow	49	4	8%
	Dog	317	4	1%
	Horse/Donkey	23	3	13%
	Goat	3	0	0%
	Llama	1	1	100%
	Pig	1	0	0%
	Rabbit	1	0	0%
	Sheep	4	0	0%
Wildlife	Badger	1	0	0%
	Bat	171	6	4%
	Bobcat	2	0	0%
	Coyote	5	0	0%
	Deer	1	0	0%
	Fox	5	1	20%
	Gopher	1	0	0%
	Ground hog	2	0	0%
	Mole	3	0	0%
	Mouse/Rat	12	0	0%
	Monkey	1	0	0%
	Opossum	5	0	0%
	Raccoon	50	1	2%
	Skunk	70	38	54%
	Squirrel	8	0	0%
	Woodchuck	1	0	0%

The state's predominant rabies virus variant, the "south central skunk" variant, was found in all of the positive rabies terrestrial animals that were typed in Kansas during 2013.

Bats have been associated with most of the human cases in the United States. Six of the 171 bats submitted for testing in Kansas were positive for rabies during 2013; four were big brown bats (*Eptesicus fuscus*), one eastern red bat (*Lasiurus borealis*), and one hoary bat (*Lasiurus cinereus*).

Public health officials are required to identify all potential contacts (animal and human) of each rabid animal, which entails extensive investigation of each case. Thirty-seven of 60 rabid animals had at least one animal contact; 59 animal contacts were identified. Nineteen of the 60 rabid animals had at least one human contact; 76 human contacts were identified. Of those people with reported exposure to confirmed rabid animals, 22 were recommended PEP by public health officials; however, 50 people received PEP (Table 2).

Table 4: PEP receipt of contacts to rabies-positive animals, Kansas, 2013

Species	# of Positive Cases with Human Contact	# of Contacts Recommended PEP	# of Contacts Received PEP
Bat	3	1	1
Cow	6	4	6
Dog	37	6	26
Donkey	4	4	4
Horse	10	4	10
Llama	3	0	0
Raccoon	3	0	0
Skunk	10	3	3

There were no human rabies cases in Kansas in 2013; the last human rabies case in Kansas was reported in 1968.

SALMONELLOSIS

(non-typhoidal)

CLINICAL FEATURES: Acute gastroenteritis with sudden onset of fever, headache, diarrhea, abdominal pain, nausea, and sometimes vomiting. Dehydration may be severe. Asymptomatic infections and extraintestinal infections can occur. Children younger than 4 years of age, elderly individuals, and persons with immunosuppressive conditions may experience severe complications, including invasive infection and mortality.

CAUSATIVE AGENT: *Salmonella enterica* subsp. *enterica* serovars, gram-negative bacteria (~2,000 serotypes cause human infection)

MODE OF TRANSMISSION: Naturally found in a wide range of domestic and wild animals, such as poultry, livestock, reptiles, and pets. Transmission occurs by ingestion of organisms in water or food contaminated by feces of an infected animal or person or food derived from infected animals. Handling raw meat or poultry products, or contact with infected reptiles or live poultry, can also result in transmission.

INCUBATION PERIOD: 6-72 hours, usually 12-36 hours.

PERIOD OF COMMUNICABILITY: Extremely variable, usually several days to several weeks dependent upon the course of infection. A carrier state can continue for over 1 year in 1% of adults and 5% of children under 5 years of age, especially infants. Prolonged, asymptomatic fecal shedding can promote person-to-person transmission.

PUBLIC HEALTH SIGNIFICANCE*:* Disease can be prevented by promotion of good hand washing and food handling practices. Symptomatic food handlers should be excluded from normal duties. Outbreak situations should be examined for a common vehicle of transmission. Situations in which control cannot be established may require exclusion of infected persons from daycare, patient care, or food handling.

REPORTABLE DISEASE IN KANSAS SINCE: 1982

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

- Isolation of *Salmonella* from a clinical specimen.

SURVEILLANCE CASE DEFINITIONS

- *Confirmed:* A case that is laboratory confirmed.
- *Probable:* A clinically compatible case that is epidemiologically linked to a confirmed case.

EPIDEMIOLOGY AND TRENDS

In 2013, 424 cases (423 confirmed and 14 probable) of salmonellosis were reported in Kansas. The three-year median for 2010-2012 was 450 cases. Cases ranged in age from less than 1 year to 95 years; the median age was 31 years. Though salmonellosis occurred in persons of all age groups, it was most frequently reported among those less than 5 years of age (19% of cases, 39.92 per 100,000 population). 130 cases (31%) were hospitalized and four (1%) deaths were reported.

One confirmed outbreak was identified in Kansas in 2013; three cases were associated with attendance at a county fair. In addition, Kansas was involved in two multistate outbreaks. Two cases were associated with eating at a restaurant in another state, and nineteen cases were associated with an outbreak linked to live poultry.

Complete serotype information was available for 362 (85%) of the confirmed cases.

Most Common *Salmonella* serotypes, Kansas, 2013

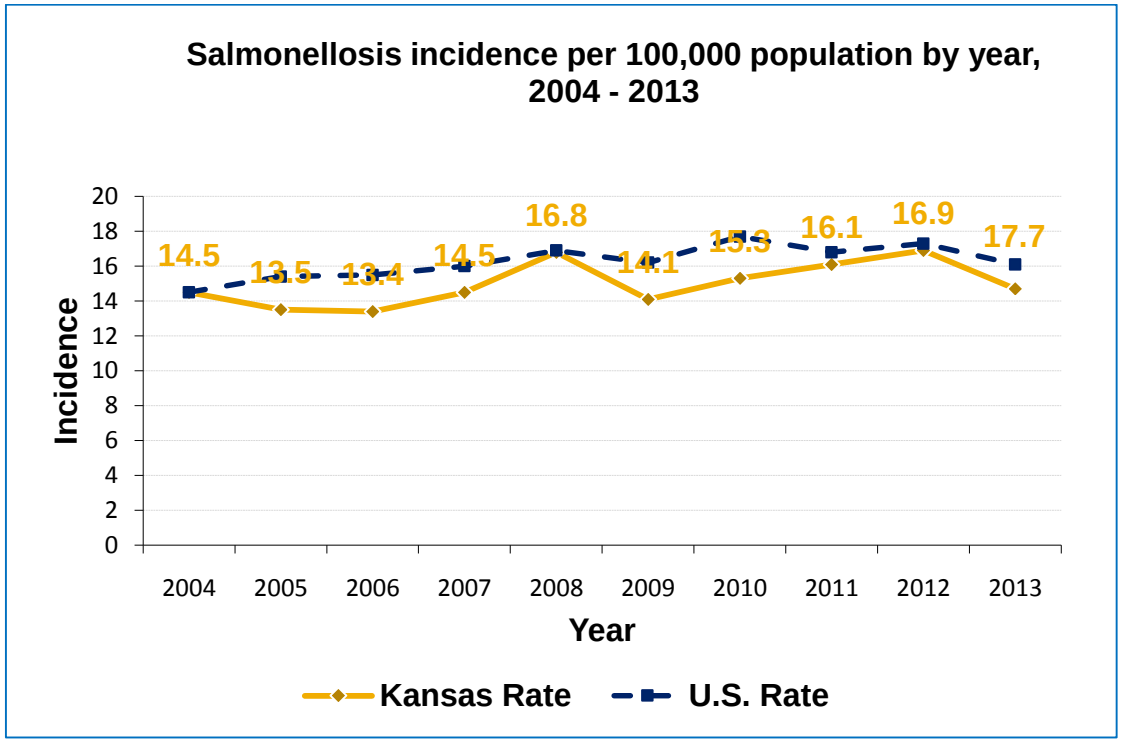
Salmonella Serotype	Number of Confirmed Cases	% of Total Confirmed Cases
Typhimurium	104	24.5
Enteritidis	55	13.0
Newport	45	10.6
Heidelberg	18	4.2
I 4,[5],12:i:-	18	4.2
Montevideo	10	2.4
Muenchen	10	2.4
Braenderup	9	2.1
Thompson	9	2.1
Saintpaul	7	1.7
Infantis	6	1.4
Oranienburg	6	1.4

Specimen Sources for *Salmonella* Isolates, Kansas, 2013

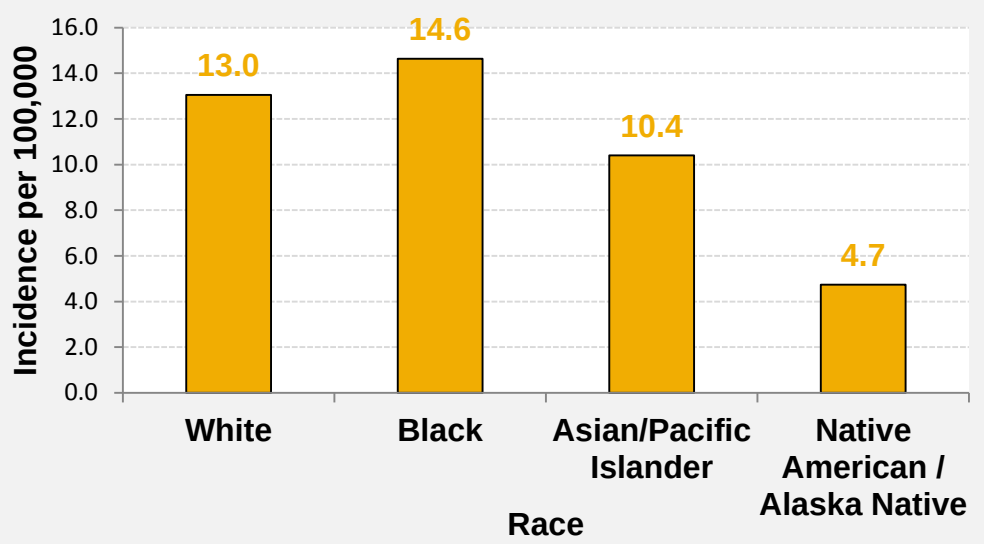
Specimen Source	Number of Confirmed Cases	% of Total Confirmed Cases
Stool	357	84.2
Urine	39	9.2
Blood	15	3.5
Wound	5	1.2
Unknown/Other	8	1.9

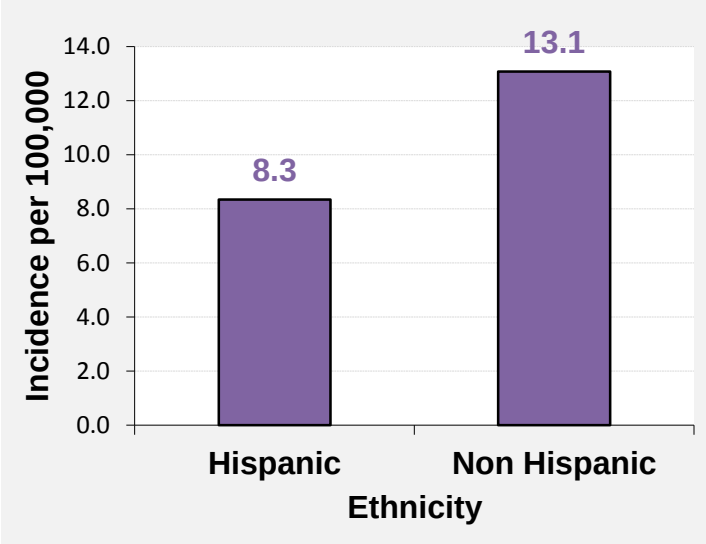
Confirmed and Probable Cases: 424

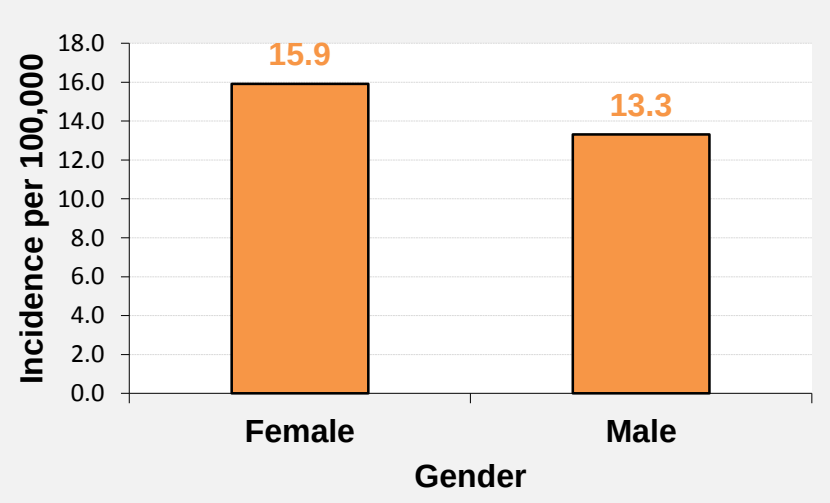
Kansas incidence per 100,000 population (2013): 14.65
U.S. incidence per 100,000 population (2013): 16.13

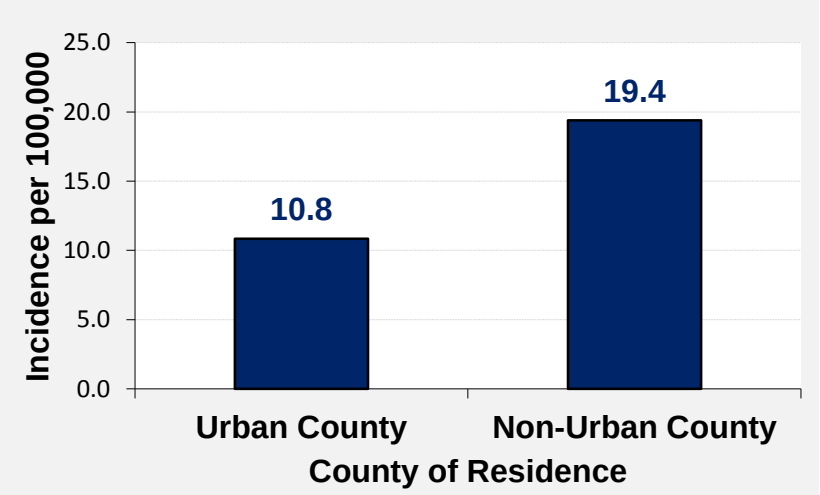


Salmonellosis incidence per 100,000 population, Kansas, 2013

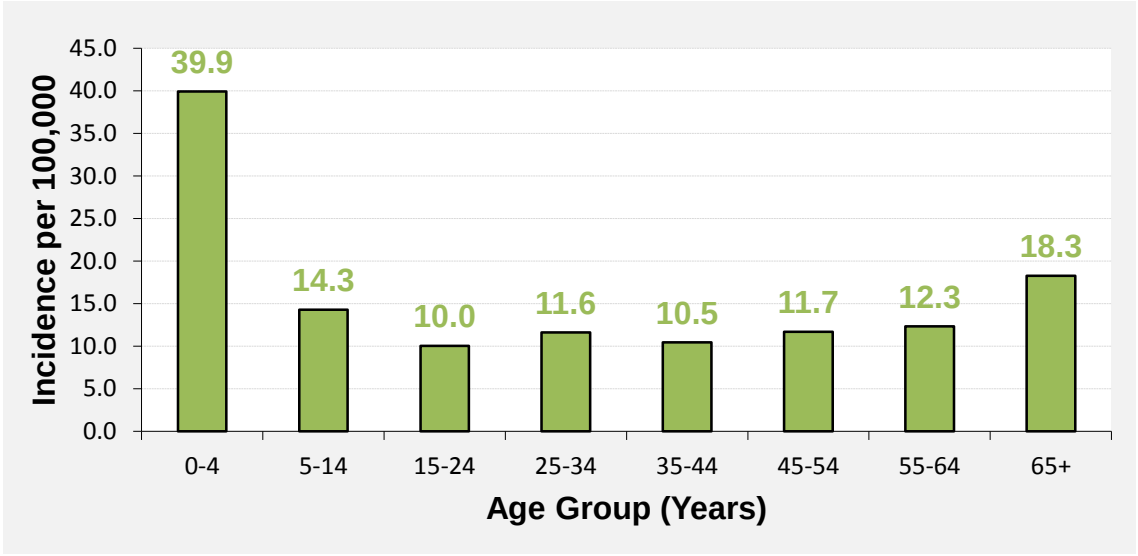




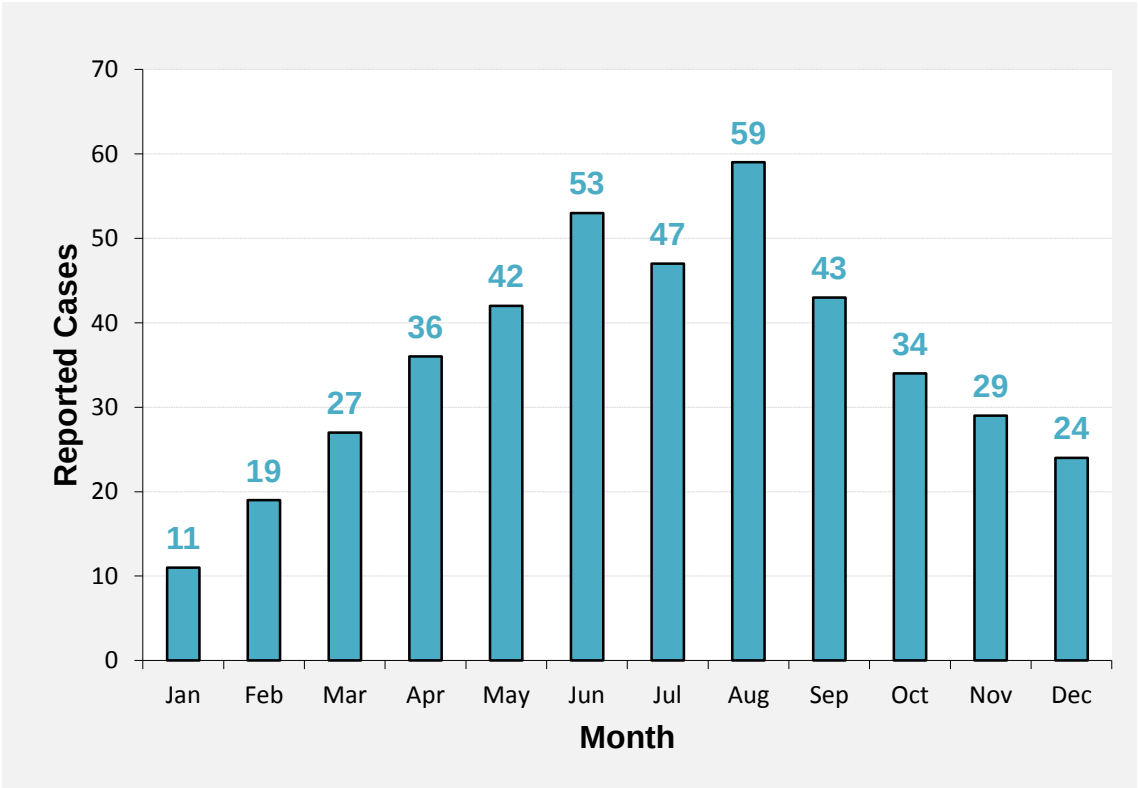




Salmonellosis incidence per 100,000 population
Kansas, 2013



Salmonella cases per month
Kansas, 2013



SHIGA TOXIN-PRODUCING *ESCHERICHIA COLI*

CLINICAL FEATURES: Most strains of *E. coli* are harmless and live in the intestines of healthy humans and animals; other strains may cause disease in humans. The most virulent of these strains is Shiga toxin-producing *E. coli* (STEC), formally known as enterohemorrhagic *E. coli* (EHEC). *E. coli* O157:H7 is the predominant STEC serotype. Illness due to STEC is usually self-limiting and consists of severe abdominal cramping and bloody diarrhea. Serious clinical manifestations, including hemolytic-uremic syndrome (HUS), a complication that alters normal kidney function; and postdiarrheal thrombotic thrombocytopenic purpura (TTP), a blood and kidney illness that affects the nervous system, may occur, particularly among immunocompromised individuals, young children, and the elderly.

CAUSATIVE AGENT: *E. coli* consists of a diverse group of bacteria. Pathogenic (illness-causing) *E. coli* strains are categorized into pathotypes. Six pathotypes are associated with diarrhea and collectively are referred to as diarrheagenic E. coli. These include Shiga toxin-producing *E. coli* (STEC), enterotoxigenic *E. coli* (ETEC), enteropathogenic *E. coli* (EPEC), enteroaggregative *E. coli* (EAEC), enteroinvasive *E. coli* (EIEC), and diffusely adherent *E. coli* (DAEC). Only STEC is a reportable disease in Kansas.

MODE OF TRANSMISSION: Transmission of STEC strains occurs via the fecal-oral route, during which susceptible individuals ingest food or liquids contaminated with human or animal feces. Outbreaks of STEC infections have been linked to eating undercooked ground beef, consuming contaminated produce, and drinking contaminated water or unpasteurized juice. Person-to-person transmission can occur, especially within daycare settings and nursing homes. Zoonotic transmission of STEC can also occur, particularly from cows and goats, and outbreaks have been linked to petting zoos.

INCUBATION PERIOD: May range from 1 to 10 days (usually 3-4 days).

PERIOD OF COMMUNICABILITY: The bacteria typically disappears from the feces by the time the illness is resolved, but may be shed for several weeks, even after symptoms go away. Young children tend to carry STEC longer than adults. A few people keep shedding these bacteria for several months.

PUBLIC HEALTH SIGNIFICANCE: Diarrhea-causing *E. coli* is often associated with contaminated beef and food products. Monitoring this disease serves as a potential indicator to problems in meat, fruit, and/or vegetable processing. A product recall may be issued if *E. coli* O157:H7 contamination is suspected—the USDA enforces a "zero tolerance" policy on this pathogen. Outbreaks associated with daycares and petting zoos are of significance due to the increased likelihood of HUS development in children infected with STEC.

REPORTABLE DISEASE IN KANSAS SINCE: 1997

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

- Laboratory confirmed:
  - Isolation of STEC from a clinical specimen. *Escherichia coli* O157 isolates that produce the H7 antigen may be assumed to be Shiga toxin-producing. For all other *E. coli* isolates, Shiga toxin production or the presence of Shiga toxin genes must be determined to be considered STEC.
  - Both asymptomatic infections and infections at sites other than the gastrointestinal tract, if laboratory confirmed, are considered confirmed cases that should be reported.
- Supportive laboratory results:
  - A case with isolation of E. coli O157 from a clinical specimen, without confirmation of H antigen or Shiga toxin production
  - Identification of an elevated antibody titer to a known STEC serotype from a clinically compatible case
  - Identification of Shiga toxin in a specimen from a clinically compatible case without the isolation of STEC

SURVEILLANCE CASE DEFINITIONS

- *Suspect*:
  - A case of postdiarrheal HUS or TTP, ***OR***
  - Identification of Shiga toxin in a specimen from a clinically compatible case without the isolation of the Shiga toxin-producing *E. coli.*

- *Probable*:
  - A case with isolation of *E. coli* O157 from a clinical specimen, without confirmation of H antigen or Shiga toxin production, ***OR***
  - A clinically compatible case who is a contact of an STEC case or is a member of a defined risk group during an outbreak, ***OR***
  - Identification of an elevated antibody titer to a known Shiga toxin-producing *E. coli* serotype from a clinically compatible case.

- *Confirmed*: A case that meets the laboratory criteria for diagnosis.

EPIDEMIOLOGY AND TRENDS

Of the 89 confirmed cases of Shiga toxin-producing *Escherichia coli* reported in Kansas during 2013, 36 (40%) were caused by *E. coli* O157. The remaining cases were attributed to other STEC strains.

Shiga toxin-producing *E. coli* cases by serotype, Kansas, 2013

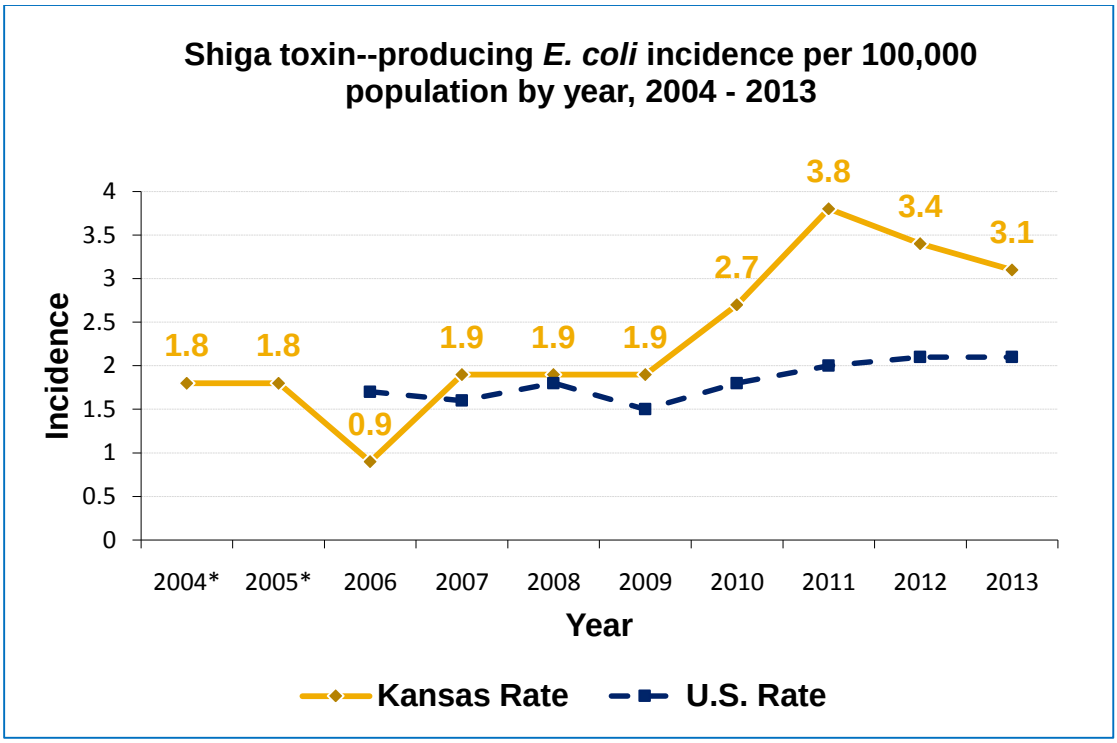
Serotype	Number of Cases
O157	36
O26	15
O111	14
O103	10
O121	5
O118	3
Undetermined	2
O145	1
O43	1
O5	1
O69	1

Kansas's three-year median for 2010-2012 was 97 cases. There were no probable STEC cases in 2013.

The highest rate of disease (10.98 per 100,000) was reported among children aged less than five years. Four of the 89 cases progressed to postdiarrheal hemolytic uremic syndrome (HUS).

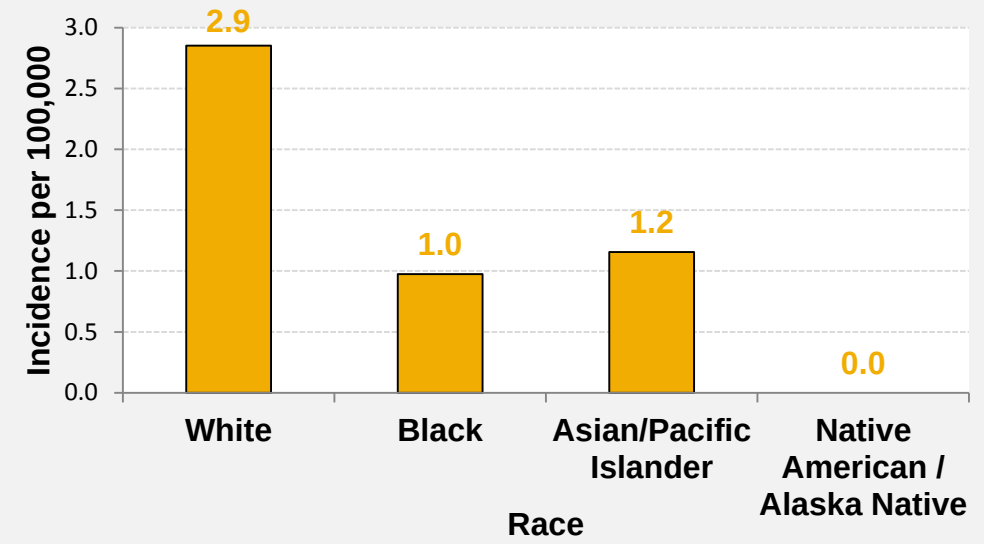
Confirmed and Probable Cases: 89

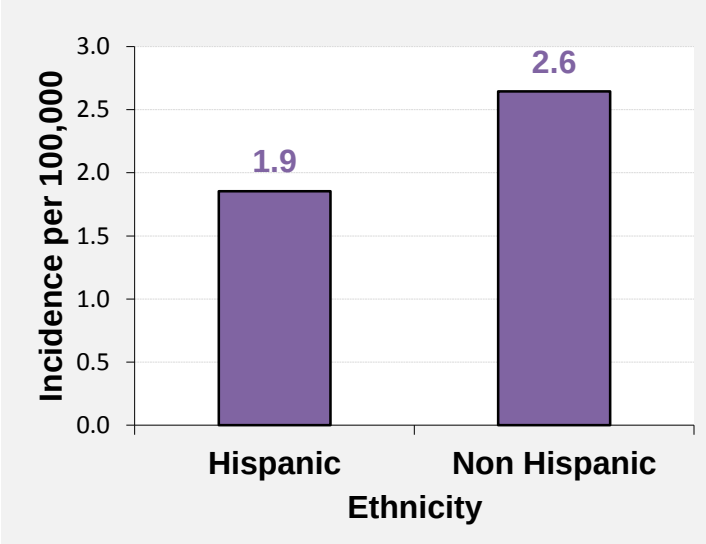
Kansas incidence per 100,000 population (2013): 3.08
U.S. incidence per 100,000 population (2013): 2.13

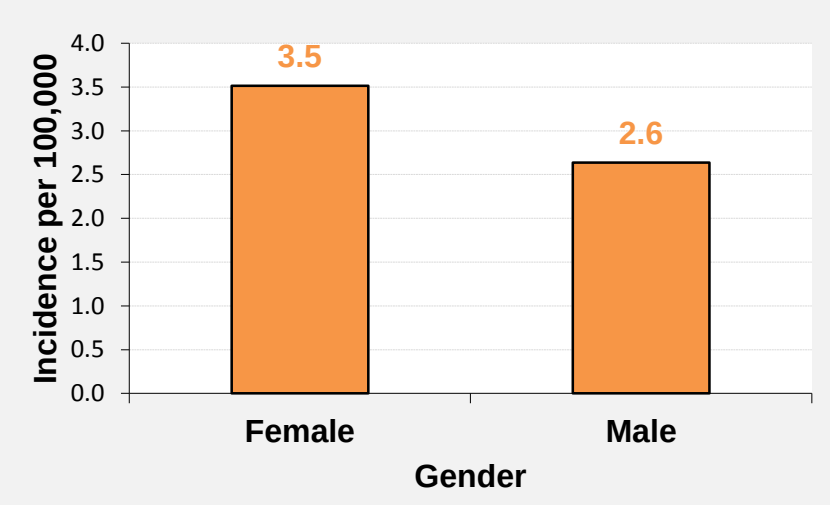


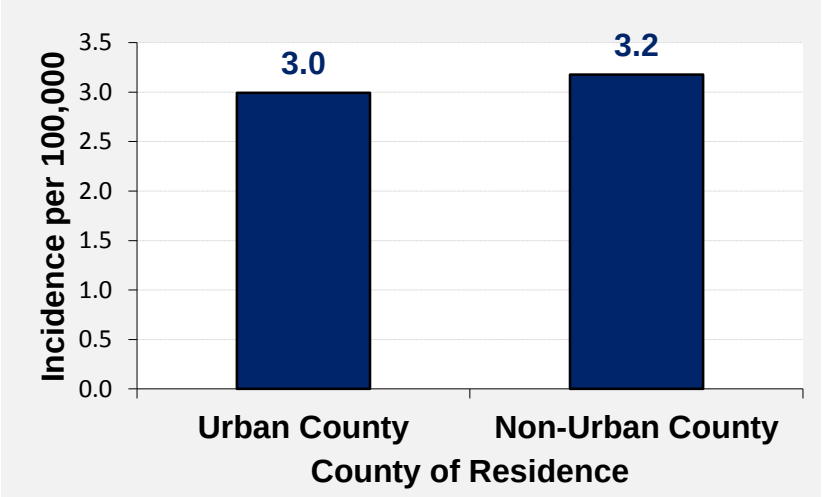
**** STEC was not nationally reportable before 2006***

Shiga toxin-producing *E. coli* incidence per 100,000 population, Kansas, 2013

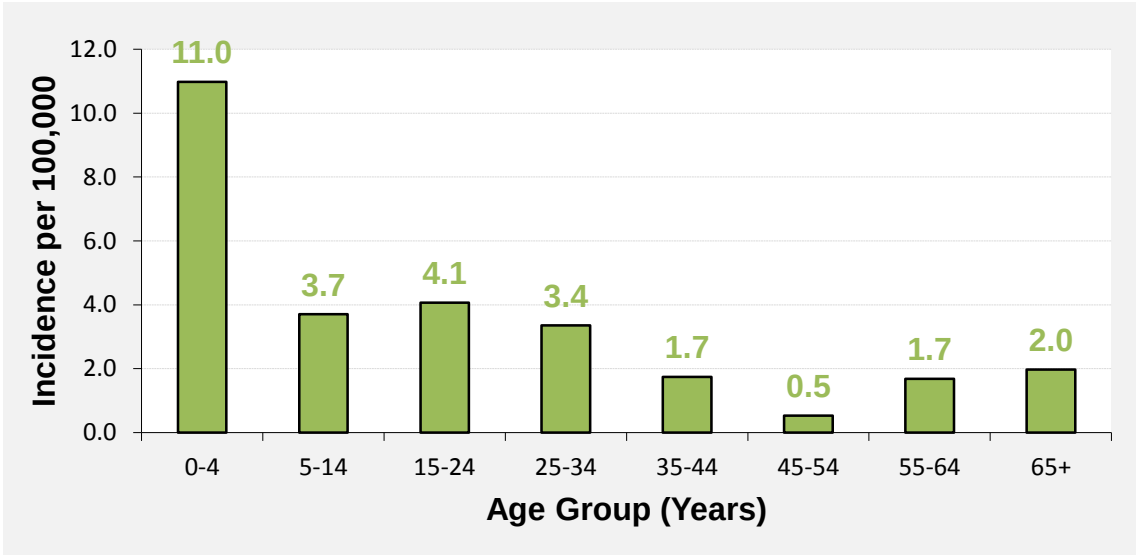




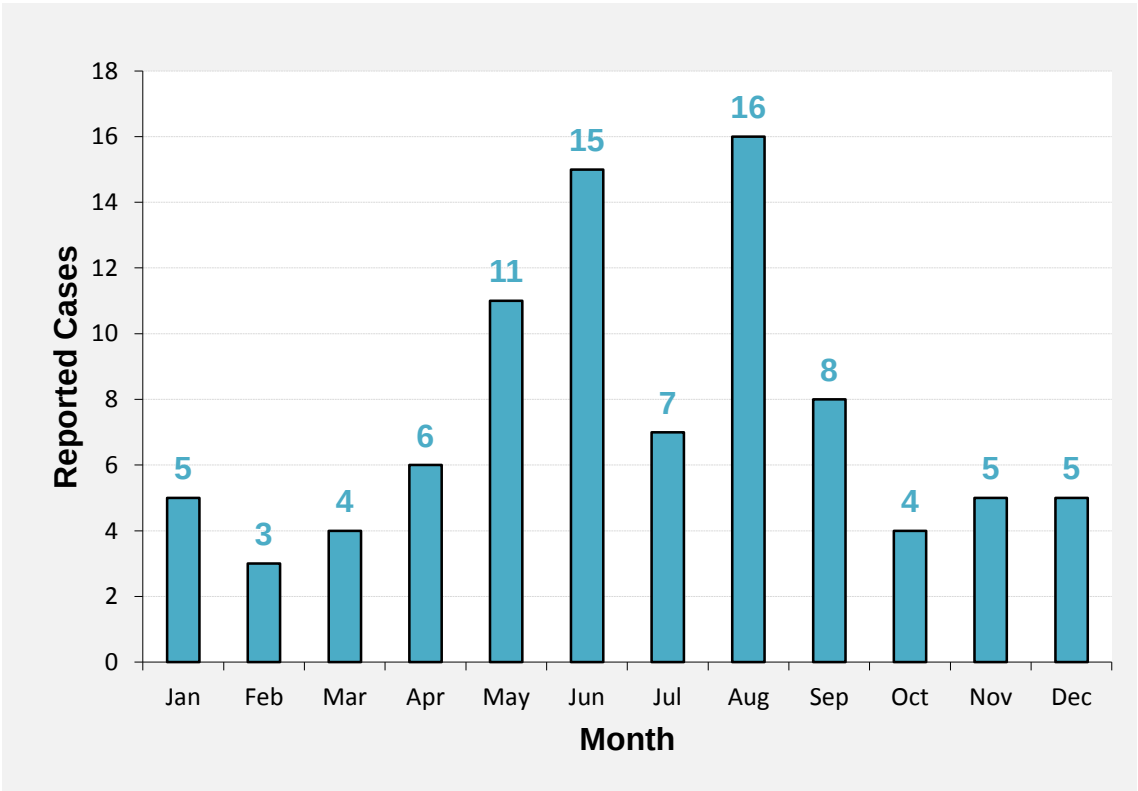




Shiga toxin-producing *E. coli* incidence per 100,000 population, Kansas, 2013



Shiga toxin-producing *E. coli* cases per month Kansas, 2013



SHIGELLOSIS

CLINICAL FEATURES: Illness of variable severity characterized by diarrhea, fever, nausea, cramps, and tenesmus. Asymptomatic infections may occur.

CAUSATIVE AGENT: *Shigella* spp., a gram-negative bacterium, including *S. flexneri, S. sonnei, S. boydii,* and *S. dysenteriae.*

MODE OF TRANSMISSION: Primarily spread through fecal-oral transmission through direct or indirect contact. May also be spread through water or milk by direct fecal contamination. Humans are the natural host for *Shigella*.

INCUBATION PERIOD: Ranges from 12 hours to 7 days (average 2 to 4 days).

PERIOD OF COMMUNICABILITY: During the acute illness until the organism is no longer present in feces. Organism will usually clear within 4 weeks of illness onset, although in rare cases it may persist for months.

PUBLIC HEALTH SIGNIFICANCE: Disease may be prevented by promotion of good hand washing. Outbreaks are common among homosexual men, in conditions of overcrowding, and in day care and institutional settings; exclusion policies may apply in some outbreak situations.

REPORTABLE DISEASE IN KANSAS SINCE: 1982

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

- Isolation of *Shigella* spp. from a clinical specimen.

SURVEILLANCE CASE DEFINITIONS

- *Confirmed:* A case that is laboratory confirmed.
- *Probable:* A clinically compatible case that is epidemiologically linked to a confirmed case.

EPIDEMIOLOGY AND TRENDS

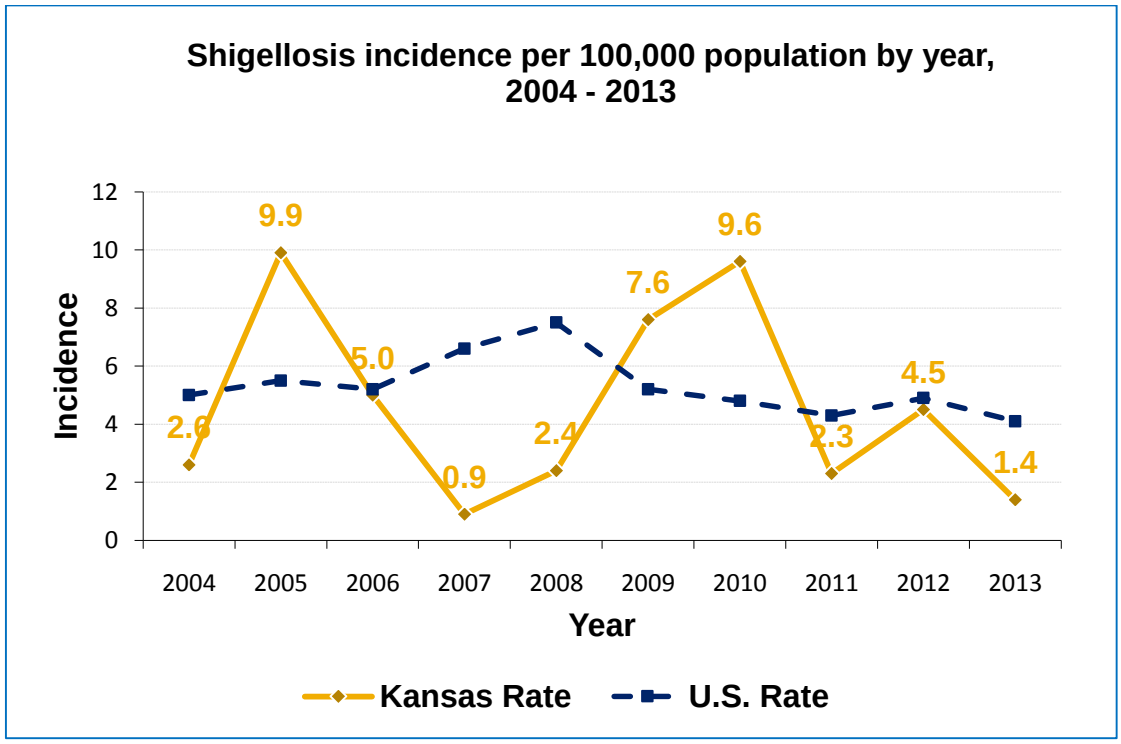
In 2013, 40 confirmed and probable cases of shigellosis were reported in Kansas. The three-year median for 2010-2012 was 129 cases.

Cases ranged in age from one year to 89 years. The median age was eighteen years. Almost one-half (48%) of the cases occurred among children less than 15 years of age; the highest incidence rate occurred in those zero to five years of age (5.0 per 100,000).

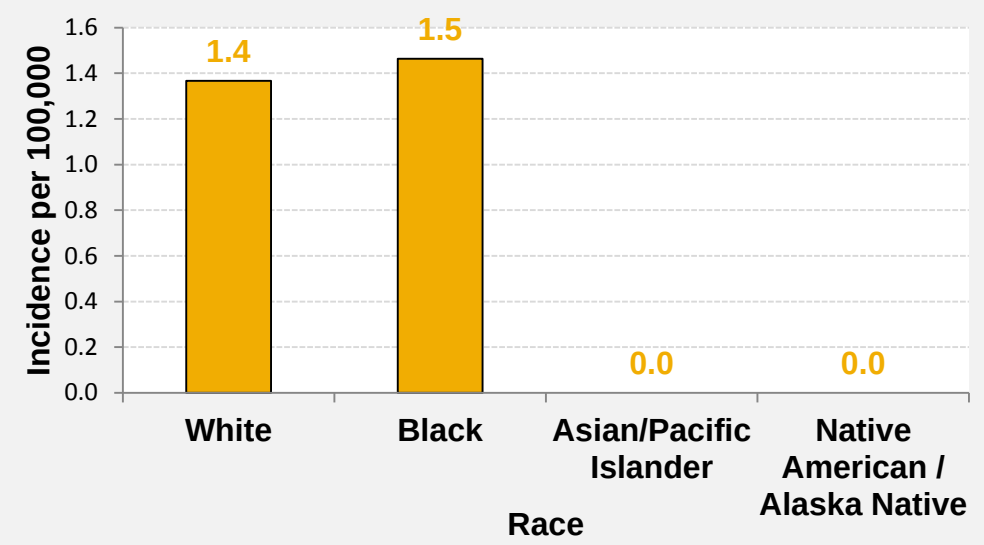
The species of *Shigella* was reported for 15 (38%) of the 40 total cases; 28 (70%) were identified as *S. sonnei* and 6 (15%) were *S. flexneri*.

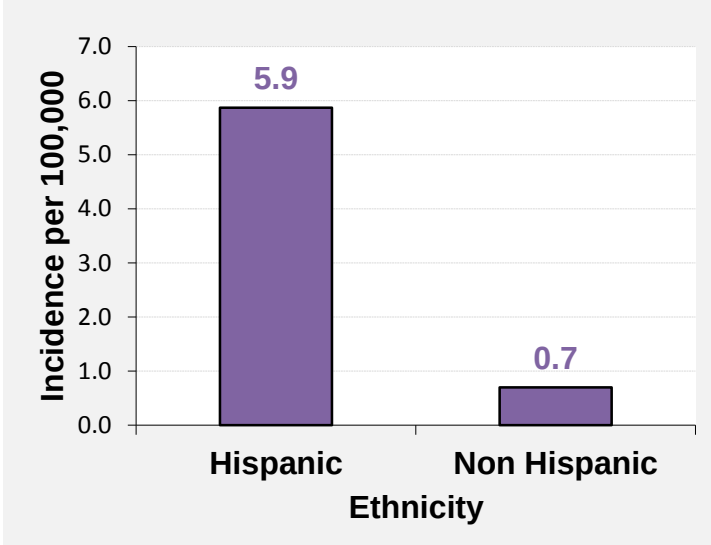
Confirmed and Probable Cases: 40

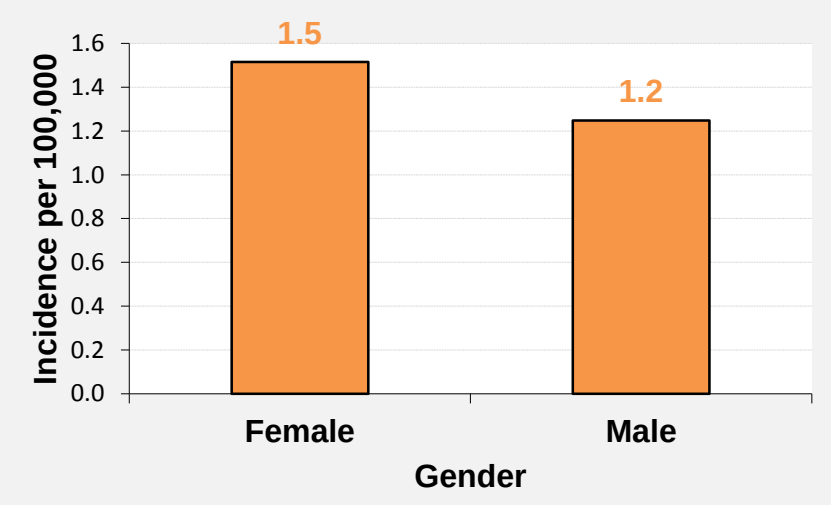
Kansas incidence per 100,000 population (2013): 1.38
U.S. incidence per 100,000 population (2013): 4.06

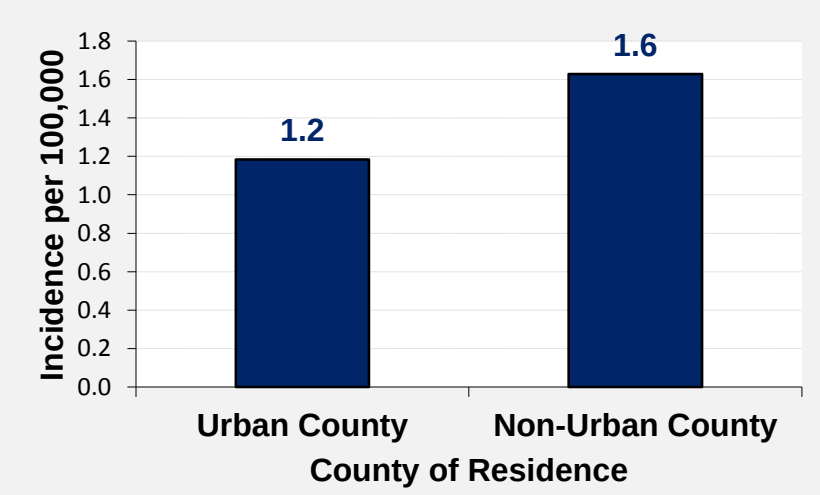


Shigellosis incidence per 100,000 population, Kansas, 2013

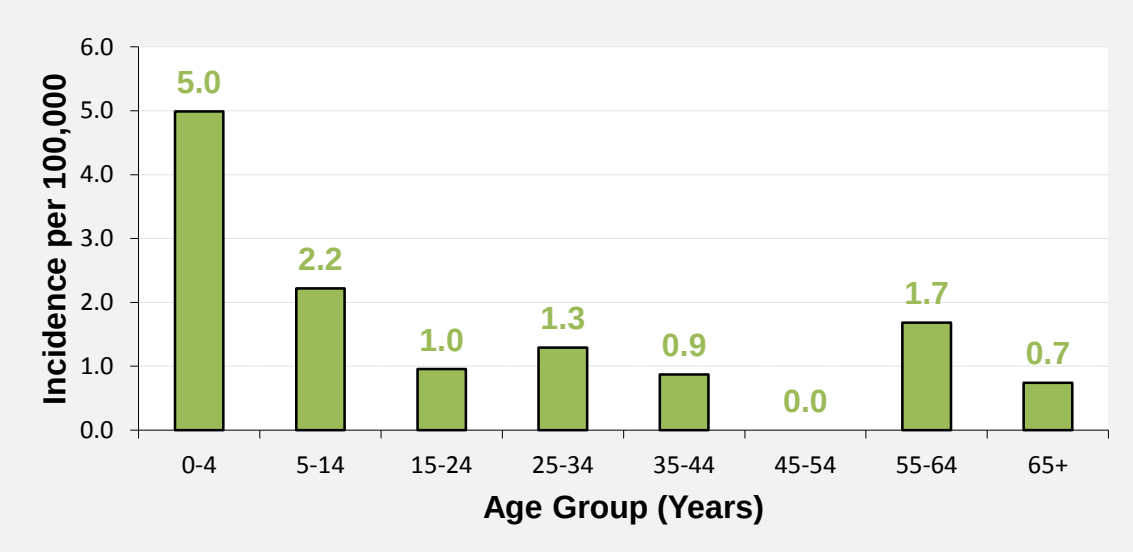




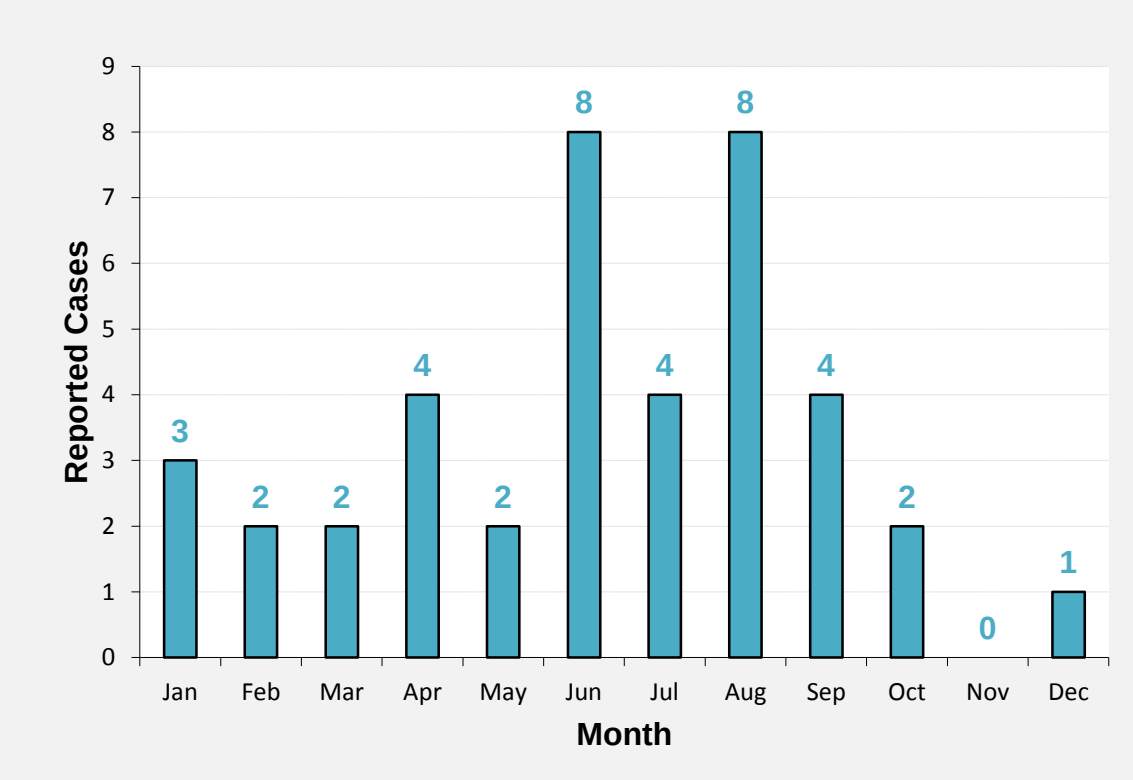




Shigellosis incidence per 100,000 population, Kansas, 2013



Shigellosis cases per month
Kansas, 2013



SPOTTED FEVER RICKETTSIOSIS

CLINICAL FEATURES: All rickettsioses cause fever, rash, and vasculitis. In the case of Rocky Mountain spotted fever, cases initially present with sudden onset of moderate to high fever, malaise, deep muscle pain, severe headache, chills, and loss of appetite. A rash will appear 2 – 5 days after the onset of fever, and may be accompanied by abdominal pain, joint pain, and diarrhea. The characteristic rash will typically begin on the extremities, including the palms of the hands and soles of the feet, and may spread rapidly to the rest of the body

CAUSATIVE AGENT: *Rickettsia* spp. *Rickettsia rickettsii* causes Rocky Mountain spotted fever, which is maintained in nature during the complete life cycle of ticks and can be transmitted to dogs, rodents, and other animals.

MODE OF TRANSMISSION: Through the bite of an infected tick, or by contamination of broken skin by infected tick feces or blood. Typically, at least 4-6 hours of attachment is required for the *Rickettsiae* to reactivate and become infectious to humans.

INCUBATION PERIOD: From 3 days to about 14 days for Rocky Mountain spotted fever.

PERIOD OF COMMUNICABILITY: None, there is no direct transmission from person-to-person. Ticks remain infectious for their entire life, as long as 18 months.

PUBLIC HEALTH SIGNIFICANCE: Disease may be prevented through personal protective measures against ticks. No vaccine is currently licensed in the US. Case fatality rate for untreated cases is between 13% and 25%; death is uncommon in cases with prompt recognition and treatment.

REPORTABLE DISEASE IN KANSAS SINCE: 1982

EPIDEMIOLOGY AND TRENDS

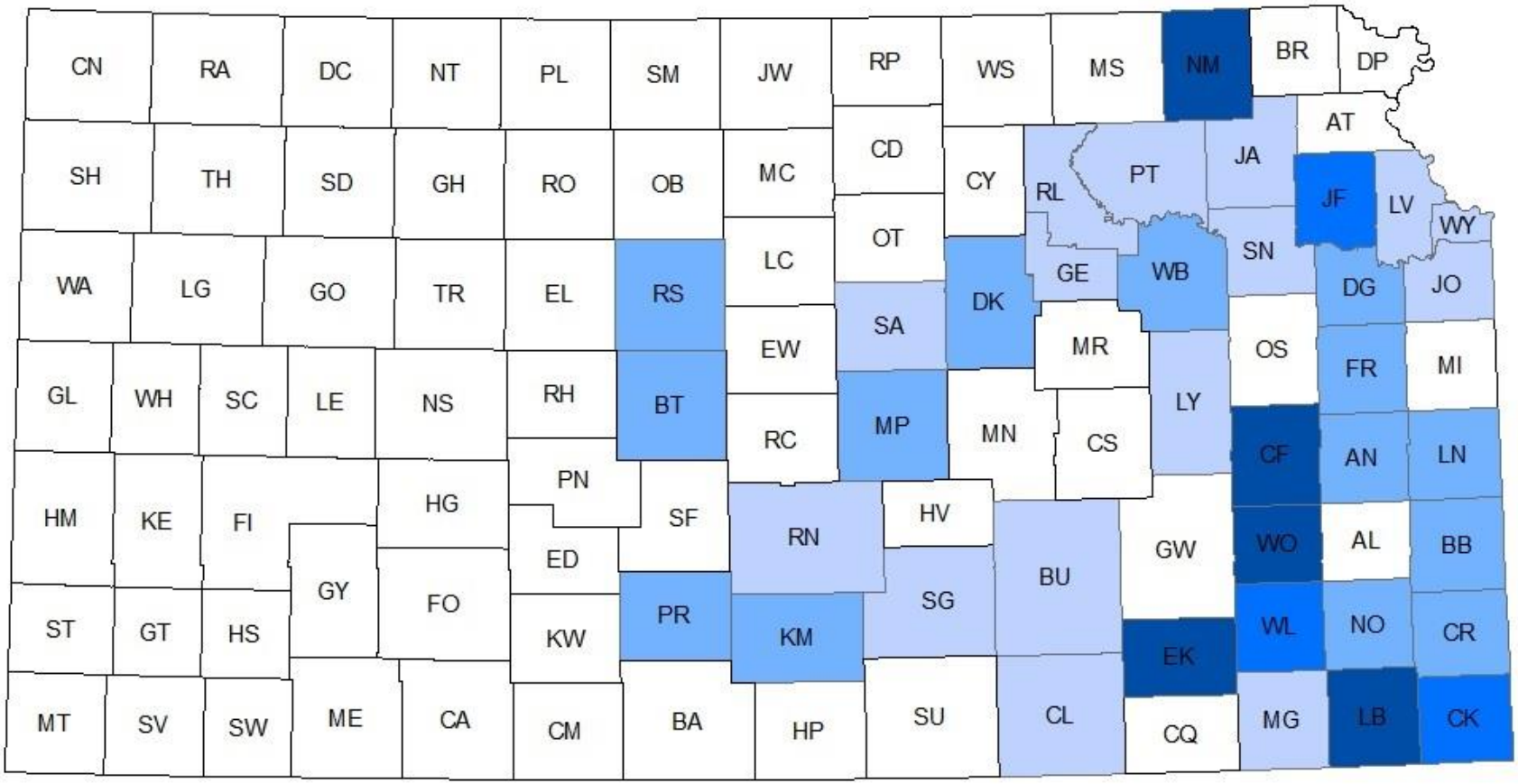
In 2013, 168 confirmed and probable cases of spotted fever rickettsiosis were reported in Kansas. All but two cases were classified as probable. Fifty-two (31%) cases were hospitalized. No deaths were reported. Cases ranged in age from three to 93 years, with a median age of 53 years. One hundred and nineteen (71%) cases were male.

For 135 cases, tick exposure most likely occurred within their county of residence (Figure 1); the remaining cases may have been exposed outside of their home county or state.

Confirmed and Probable Cases: 168

Kansas incidence per 100,000 population (2013): 5.81
U.S. incidence per 100,000 population (2013): 1.08

Incidence rate* of spotted fever rickettsiosis by county, Kansas, 2013 (n=135)



Incidence rate per 100,000 population

0.0 | 0.1-10.0 | 10.1-20.0 | 20.1-30.0 | 30.0 and Above

**Cases with reported tick exposure outside their county of residence or unknown exposures were excluded*

STREPTOCOCCAL INVASIVE DISEASE

Group A Streptococcus or Streptococcus pneumoniae

CLINICAL FEATURES: Symptoms vary and are dependent on the site of infection (e.g. acute otitis media, pneumonia, bacteremia, or meningitis). Group A infections are characterized by sudden onset of fever, shaking chill, pleural pain, dyspnea, tachypnea, and leukocytosis. Infants and young children may experience fever, vomiting, and convulsions.

CAUSATIVE AGENT: Group A *Streptococcus* (*Streptococcus pyogenes*) or *Streptococcus pneumoniae*

MODE OF TRANSMISSION: The organisms may spread directly via respiratory droplets and oral contact. Contact with articles (e.g. tissues) that have been freshly soiled with respiratory discharges may result in indirect transmission. Although the bacteria that cause invasive disease are commonly transmitted from person-to-person, invasive disease is not. Invasive illness among a patient's close and casual contacts is infrequent.

INCUBATION PERIOD: 14 hours to 3 days. (The incubation period is not clearly defined; it may be dependent on the route of infection.)

PERIOD OF COMMUNICABILITY: Untreated patients are most infectious for 2-3 weeks after the illness onset, although transmission may occur until the bacteria are no longer found in respiratory secretions. Patients are not considered infectious 24 hours after treatment has begun.

PUBLIC HEALTH SIGNIFICANCE: School and day care exclusions apply to those with streptococcal pharyngitis or skin infections. Most types of pneumococcal disease (invasive *Streptococcus pneumoniae* infections) can be prevented through vaccination.

REPORTABLE DISEASE IN KANSAS SINCE: All cases of streptococcal invasive disease have been reportable since 2000; drug-resistant strains were made reportable in 2006.

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

- Isolation of Group A *Streptococcus* (*Streptococcus pyogenes*) or *Streptococcus pneumoniae* by culture from a normally sterile site (e.g., blood, cerebrospinal fluid, or, less commonly, joint, pleural or pericardial fluid)

SURVEILLANCE CASE DEFINITIONS

- Confirmed: Isolation of Group A Streptococcus or Streptococcus pneumoniae from a normally sterile body site in a person of any age.

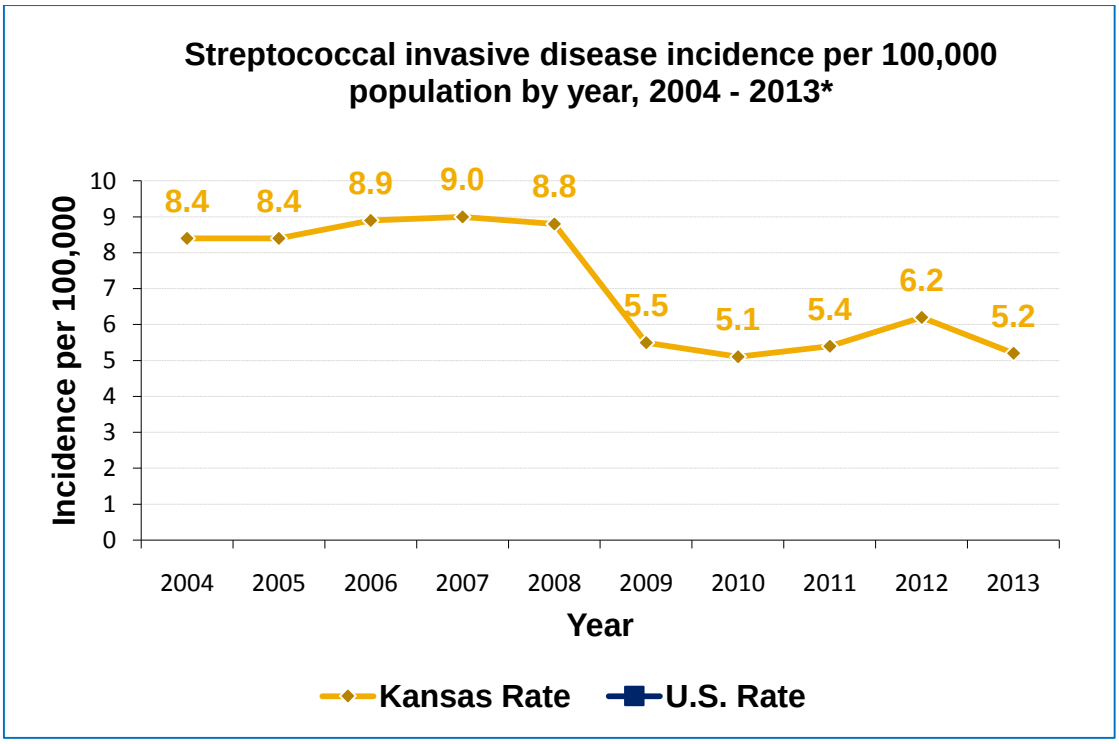
EPIDEMIOLOGY AND TRENDS

In 2013, 37 cases of Group A *Streptococcus* and 149 invasive *Streptococcus pneumoniae* infections were reported in Kansas.

Pneumococcal conjugate vaccine is recommended for children less than 2 years of age, and for high-risk children less than 5 years of age. In 2013, 9 of the 149 *S. pneumoniae* infections occurred among children less than 5 years of age (4.5 per 100,000 population). The reported national incidence for this age group in 2012 was 9 per 100,000 population. Four of the 9 cases were not yet old enough to receive the doses of vaccine needed to be fully protected from the disease.

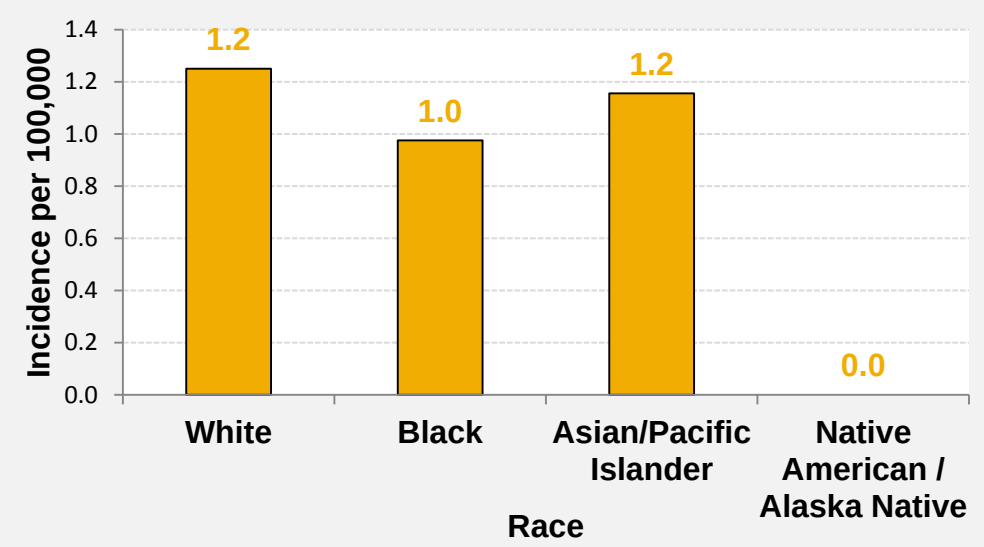
Pneumococcal polysaccharide vaccine is recommended for adults age 65 and older. In 2013, 71 (48%) of invasive *S. pneumoniae* cases occurred among this age group. The vaccination status of these cases was unknown; the pneumococcal vaccination rate among Kansans age 65 and older is 70.8%, according to the 2010 Kansas Behavioral Risk Factor Surveillance System (BRFSS).

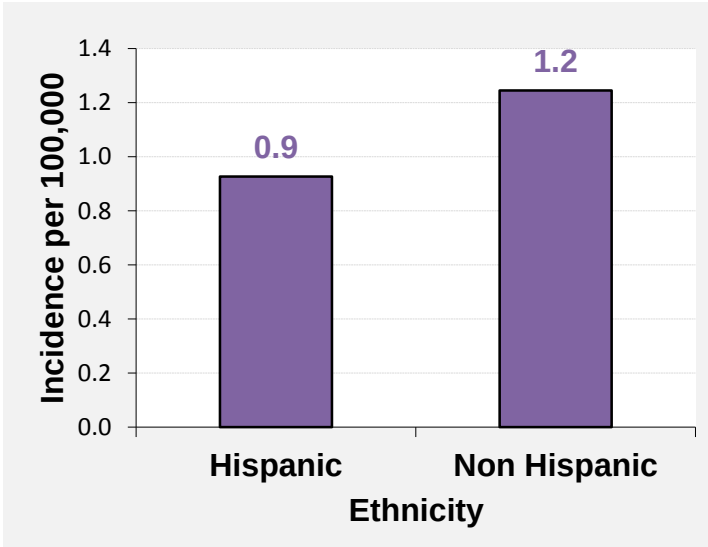
	Group A *Streptococcus*	*Streptococcus pneumoniae*
Confirmed Cases:	**37**	**149**
Kansas incidence per 100,000 population (2013):	1.28	5.15
U.S. incidence per 100,000 population (2013):	*N/A*	*N/A*

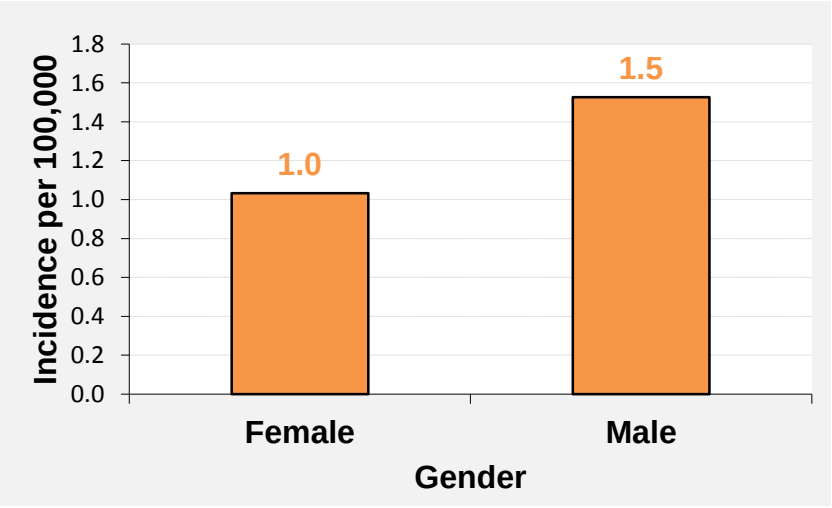


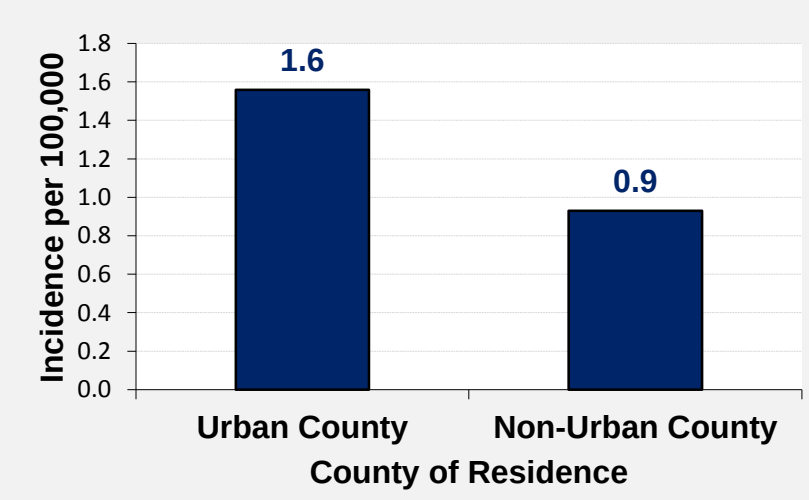
**** Only drug-resistant S. pneumoniae was reportable in Kansas from 2006 to 2010, and nationally until 2010.***

Group A Streptococcal invasive disease incidence per 100,000 population, Kansas, 2013

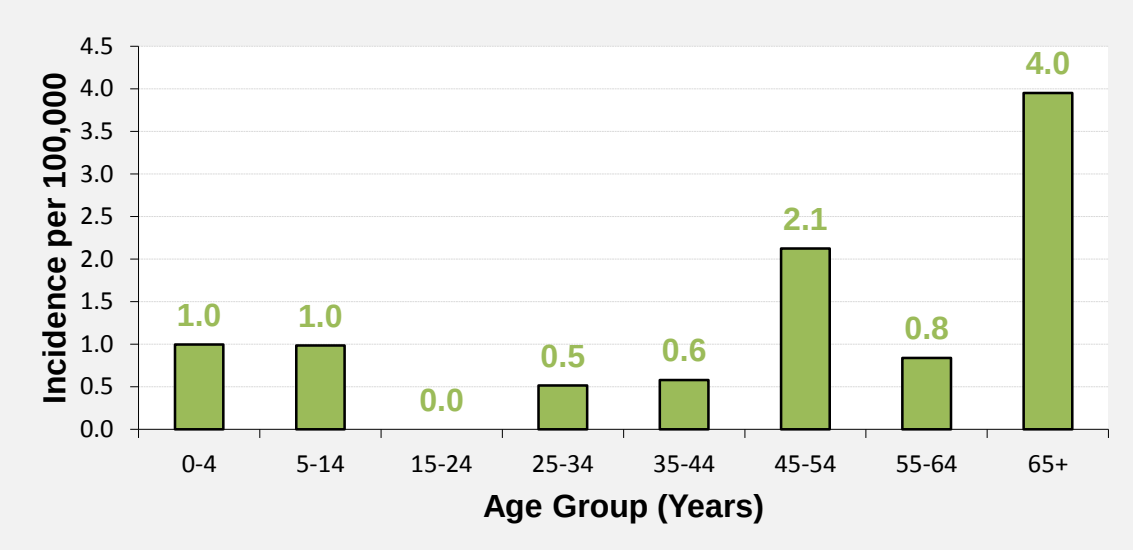




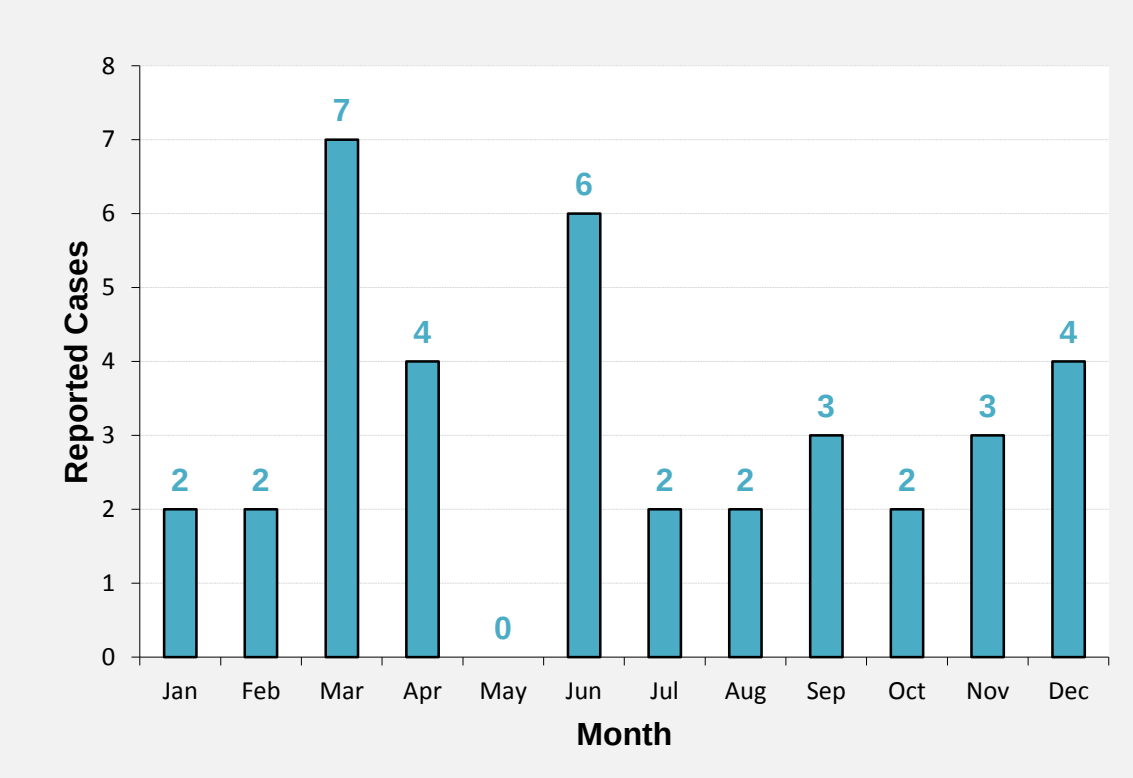




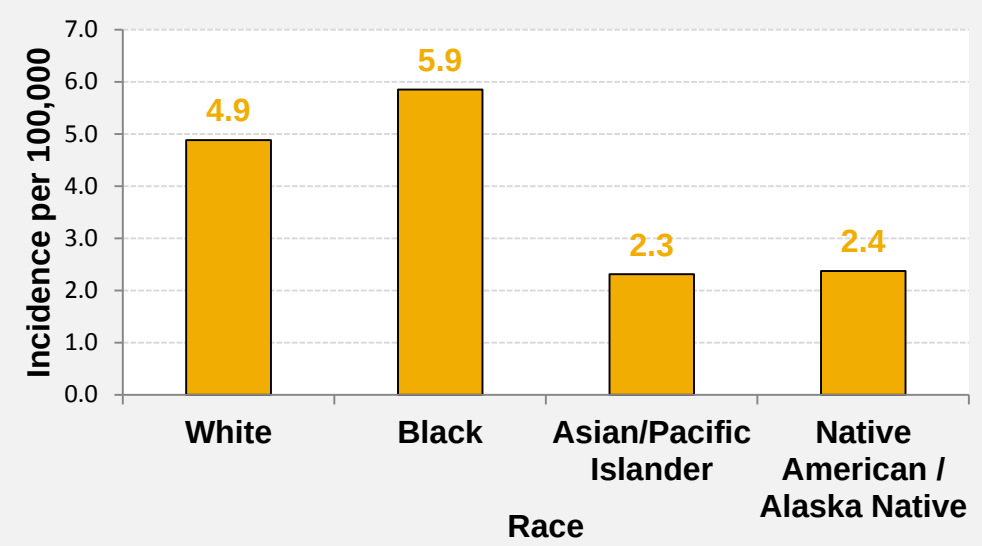
Group A Streptococcal invasive disease incidence per 100,000 population, Kansas, 2013

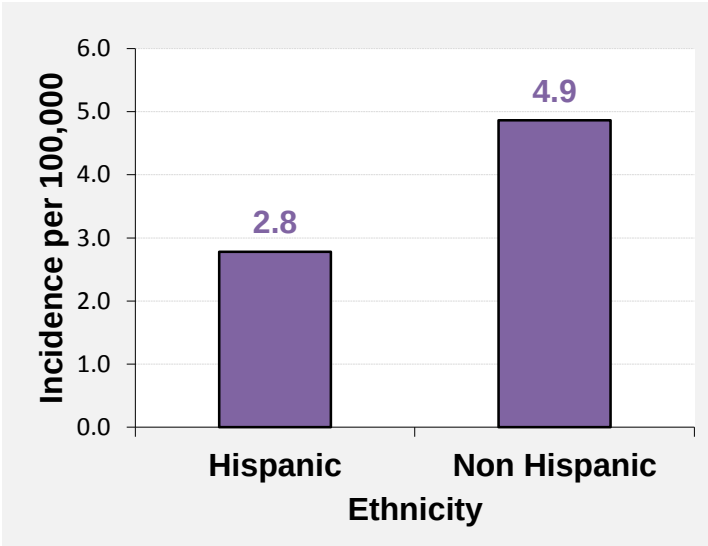


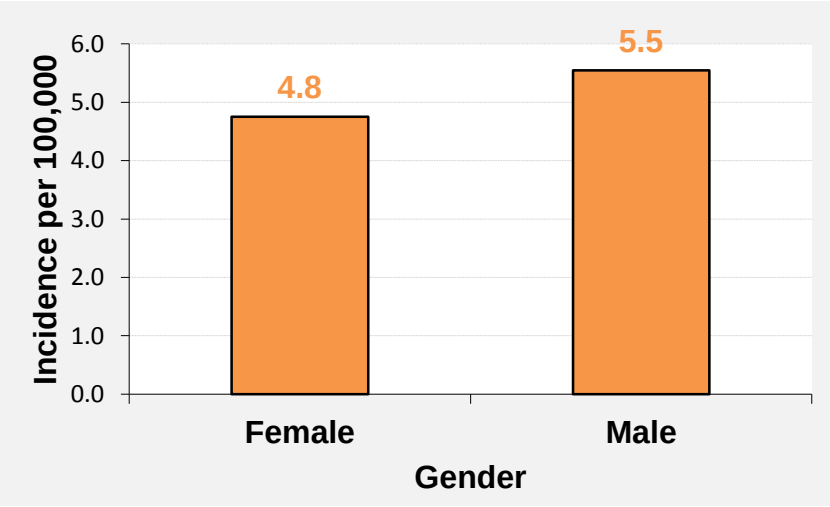
Group A Streptococcal invasive disease cases per month, Kansas, 2013

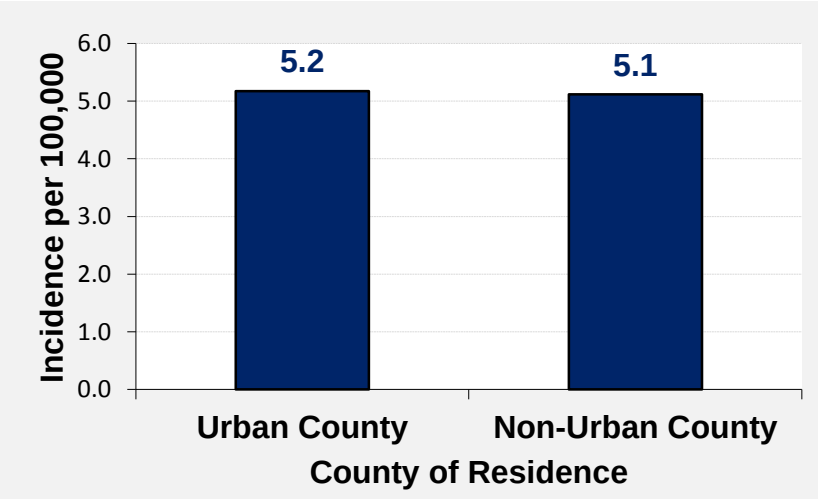


S. Pneumoniae invasive disease incidence per 100,000 population, Kansas, 2013

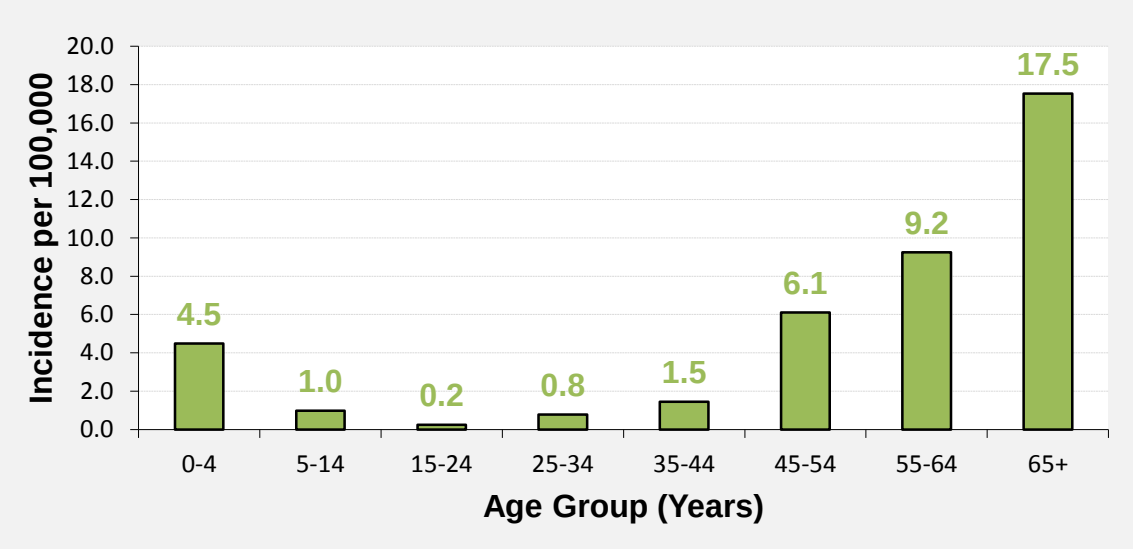




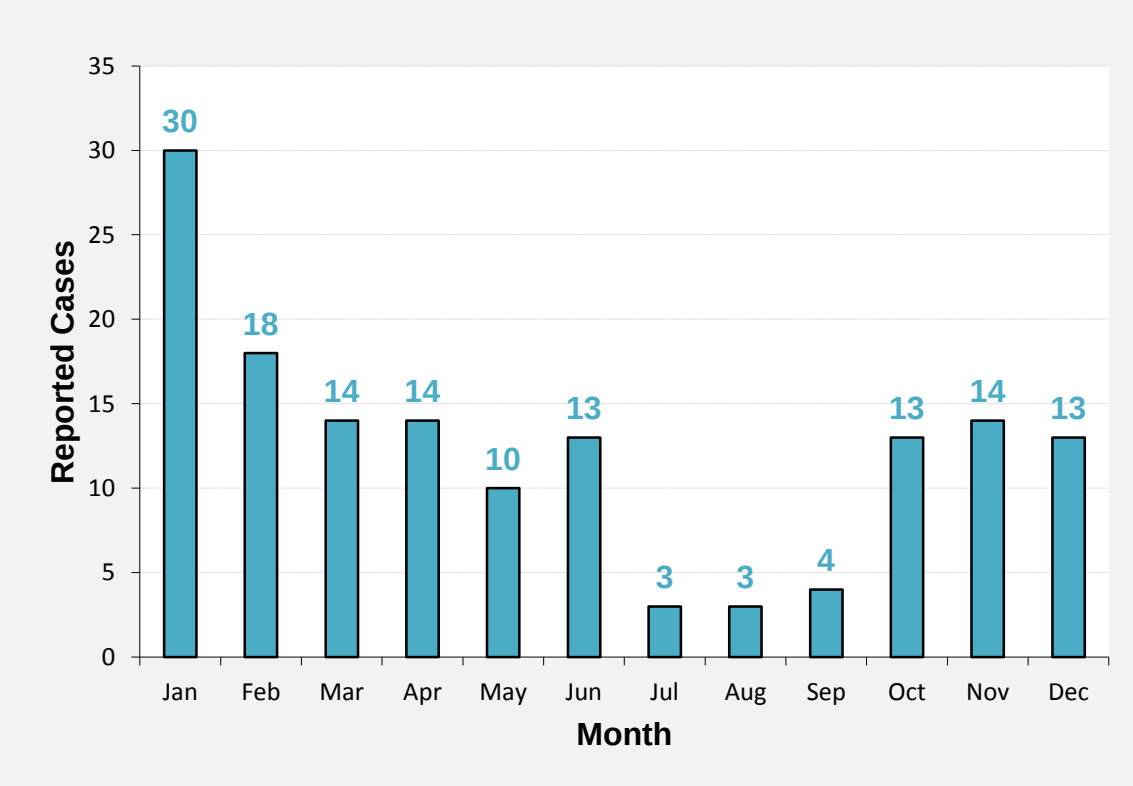




S. Pneumoniae invasive disease incidence per 100,000 population, Kansas, 2013



S. Pneumoniae invasive disease cases per month, Kansas, 2013



TRANSMISSIBLE SPONGIFORM ENCEPHALOPATHY (TSE)

or

PRION DISEASE (including Creutzfeldt-Jakob Disease)

CLINICAL FEATURES: Prion diseases or transmissible spongiform encephalopathies (TSEs) are a family of rare progressive neurodegenerative disorders that affect both humans and animals. They are distinguished by long incubation periods, characteristic spongiform changes associated with neuronal loss, and a failure to induce inflammatory response.

CAUSATIVE AGENT: The causative agent of TSEs is believed to be a prion. A prion is an abnormal, transmissible agent that is able to induce abnormal folding of normal cellular prion proteins in the brain, leading to brain damage and the characteristics signs and symptoms of the disease.

MODE OF TRANSMISSION: Most TSEs are believed to occur sporadically, due to the spontaneous transformation of normal prion proteins into abnormal proteins. However, some TSEs, such as Kuru and Variant Creutzfeldt-Jakob Disease (vCJD) have been associated with consumption of infected human or animal tissue.

INCUBATION PERIOD: Varies. TSEs have long incubation periods, measured in years.

PERIOD OF COMMUNICABILITY: Cases may be infectious for the duration of the illness, beginning early in the incubation period.

PUBLIC HEALTH SIGNIFICANCE: While most prion diseases seem to have species barriers, emphasis on disease surveillance and laboratory confirmation are needed to enhance understanding of the pathology and epidemiology of human prion diseases and to implement a system of detecting emerging human prion diseases.

REPORTABLE DISEASE IN KANSAS SINCE: 2007

EPIDEMIOLOGY AND TRENDS

In 2013, two confirmed, fatal cases of TSE were reported in Kansas. Since TSE became reportable in 2007, 1 to 5 cases have been reported annually.

Confirmed Cases: 2

Kansas incidence per 100,000 population (2013): 0.07
U.S. incidence per 100,000 population (2013): *N/A*

TULAREMIA

CLINICAL FEATURES: Most cases characterized by acute onset of fever, chills, myalgia, and headache appearing with various clinical syndromes dependent on the route of infection. Syndromes include an ulcer at the site of inoculation with regional lymphadenopathy (ulceroglandular); regional lymphadenopathy with no ulcer (glandular); conjunctivitis with preauricular lymphadenopathy (oculoglandular); stomatitis or pharyngitis or tonsillitis with cervical lymphadenopathy (oropharyngeal); intestinal pain, vomiting and diarrhea (intestinal); febrile illness without localizing signs and symptoms (typhoidal); and primary pleuropulmonary disease (pneumonic). Cases with pneumonia can develop chest pain, difficulty breathing, bloody sputum, and respiratory failure.

CAUSATIVE AGENT: *Francisella tularensis,* a gram-negative bacterium.

MODE OF TRANSMISSION: Found in numerous wild animals, especially rabbits, hares, voles, muskrats, beavers, some domestic animals (i.e. dogs and cats), and various hard ticks. The organism is transmitted through the bite of arthropods; by inoculation of skin, conjunctiva or oropharyngeal mucosa with contaminated water, blood or tissue from infected animal carcasses; by handling or ingesting insufficiently cooked meat of infected animals; by drinking contaminated water; by inhalation of contaminated dust or aerosols; rarely, from bites of carnivores whose mouth presumably was contaminated from eating an infected animal; and from contaminated pelts and paws of animals.

INCUBATION PERIOD: The incubation period ranges from 1-14 days (usually 3-5 days).

PERIOD OF COMMUNICABILITY: Not transmitted person-to-person. Draining lesions are potentially infectious.

PUBLIC HEALTH SIGNIFICANCE: In the U.S., risk of exposure is greater for those who spend a great deal of time outdoors; incidence is higher during hunting seasons and when ticks and deer flies are abundant. Illness may be prevented through education on the following risk factors: exposure to arthropod bites, exposure to potentially contaminated water, handling sick or dead wildlife, handling wild game carcasses, and ingestion of undercooked wild game. Tularemia is a potential bioterrorism agent, particularly if distributed as an aerosol.

REPORTABLE DISEASE IN KANSAS SINCE: 1990

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

- Confirmed infection:
  - Isolation of *F. tularensis* from a clinical specimen, ***OR***
  - Fourfold or greater change in serum antibody titer to *F. tularensis* antigen.

- Presumptive infection:

- Elevated serum antibody titer(s) to *F. tularensis* antigen (without documented fourfold or greater change) in a patient with no history of tularemia vaccination, ***OR***
- Detection of *F. tularensis* in a clinical specimen by fluorescent assay.

SURVEILLANCE CASE DEFINITIONS

- *Confirmed:* A clinically compatible illness that is laboratory confirmed.
- *Probable:* A clinically compatible case with laboratory results indicative of presumptive infection.

EPIDEMIOLOGY AND TRENDS

Twenty-eight cases (7 confirmed and 21 probable) of tularemia were reported in Kansas during 2013. The cases ranged from 7 to 84 years of age, with a median age of 45 years. Twenty-one (75%) cases were male. The three-year median for 2010-2012 was seven cases. Two to eleven cases have been confirmed annually since 1990. This is the second year probable cases are being reported in the annual summary.

Among the 2013 cases, ulceroglandular syndrome was reported in 11 cases, glandular syndrome was noted in 11 cases, two cases was described with intestinal syndrome, one case was described with pneumonic syndrome, and three cases did not have a primary syndrome reported. Tick bites were reported in 15 cases and four cases had contact with sick or dead animals. Ingestion of untreated water was implicated in one of the intestinal syndrome cases. There were no deaths, but 13 hospitalizations were reported, representing 46% of the cases.

Confirmed and Probable Cases: 28

Kansas incidence per 100,000 population (2013):	0.97
U.S. incidence per 100,000 population (2013):	0.06

TYPHOID FEVER

CLINICAL FEATURES: Insidious onset of sustained fever, marked headache, malaise, anorexia, relative bradycardia, splenomegaly, constipation or diarrhea, rose-colored spots on the trunk and nonproductive cough. Severity of symptoms can range from mild illness to invasive disease and complications, including death. Many mild and atypical infections occur, especially in endemic areas. Carriage of *S.* Typhi may be prolonged.

CAUSATIVE AGENT: *Salmonella* Typhi bacterium (*S. enterica* subsp. e*nterica* serovar Typhi, formerly known as *S. typhi*).

MODE OF TRANSMISSION: Humans are the only reservoir; therefore, ingestion of food (shellfish, fruit, vegetables) and water contaminated by feces and urine of *S.* Typhi cases and asymptomatic carriers are the main sources of infection. Flies also promote spread of disease.

INCUBATION PERIOD: From 3 days to over 60 days, usual range 8-14 days.

PERIOD OF COMMUNICABILITY: Dependent upon the presence of organisms in excreta, communicability is usually from the first week throughout convalescence. Among 10% of untreated patients, this can be up to 3 months. Between 2% and 5% become permanent carriers.

PUBLIC HEALTH SIGNIFICANCE: Despite the availability of a vaccine and treatment, about 12.5 million persons in developing countries experience typhoid fever annually. A case-fatality rate of 15-20% is also observed among cases who do not receive prompt treatment. Typhoid fever infection can be prevented through access to safe water, proper sanitation, avoiding consumption of risky foods and liquids, and becoming immunized.

REPORTABLE DISEASE IN KANSAS SINCE: 1982

CLINICAL CRITERIA

- Insidious onset of sustained fever, headache, malaise, anorexia, relative bradycardia, constipation or diarrhea, and nonproductive cough.

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

- Isolation of *S.* Typhi from blood, stool, or other clinical specimen.

SURVEILLANCE CASE DEFINITIONS

- *Confirmed:* A clinically compatible case that is laboratory confirmed *(NOTE: Isolation of the organism is required for confirmation. Serologic evidence alone is not sufficient for diagnosis. Asymptomatic carriage should not be reported as typhoid fever.)*

- *Probable:* A clinically compatible case that is epidemiologically linked to a confirmed case in an outbreak

EPIDEMIOLOGY AND TRENDS

Two confirmed cases of typhoid fever were reported in Kansas during 2013. Since 1994, zero to four cases have been reported annually. Both cases in 2013 reported travel to an area of the world where typhoid fever is endemic.

Confirmed Cases: 2

Kansas incidence per 100,000 population (2013):	0.07
U.S. incidence per 100,000 population (2013):	0.11

VARICELLA (CHICKENPOX)

CLINICAL FEATURES: The disease is characterized by a generalized, pruritic rash that progresses from macules to papules to vesicular lesions before crusting. Healthy, unvaccinated children normally have 200-500 lesions in 2 to 4 successive crops — the lesions are more highly concentrated on the trunk than the extremities. Rash is usually the first sign of disease in children, followed by malaise, fever, and itching. Adults may experience fever and malaise in the 1 - 2 days prior to rash onset; the clinical course in adults is often more severe than what is seen in children. Adults also have a higher risk of complications, including secondary bacterial infections, pneumonia, dehydration, aseptic meningitis, and encephalitis.

CAUSATIVE AGENT: varicella zoster virus (VZV)

MODE OF TRANSMISSION: The virus is highly transmissible from person to person. Direct contact with a case, or contact with a case's vesicle fluid or respiratory secretions (via airborne or droplet spread) may cause infection. Indirect transmission may occur if a case's vesicle fluid or respiratory secretions have soiled clothing, linens, etc.

INCUBATION PERIOD: The incubation period may range from 10 to 21 days; the average incubation period is 14 - 16 days from exposure.

PERIOD OF COMMUNICABILITY: Cases are usually infective from 1 - 2 days before the onset of rash until all lesions are crusted. Cases with altered immunity may be infectious for a longer period of time.

PUBLIC HEALTH SIGNIFICANCE: A vaccine to protect against VZV is available; vaccination is required for school entry in Kansas. Disease has been reported in vaccinated children, although these "breakout" illnesses have been mild—vaccinated children that contract varicella normally report fewer lesions (less than 50), no fever, and a shorter duration of illness compared to non-vaccinated individuals. School and daycare restrictions apply to infected enrollees. The vaccine is also effective as postexposure prophylaxis in susceptible persons.

REPORTABLE DISEASE IN KANSAS SINCE: 2003

CLINICAL CRITERIA FOR SURVEILLANCE PURPOSES

- An illness with acute onset of diffuse (generalized) maculo-papulovesicular rash without other apparent cause.

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

- Isolation of varicella virus from a clinical specimen, ***OR***
- Varicella antigen detected by direct fluorescent antibody test (DFA), ***OR***
- Varicella-specific nucleic acid detected by polymerase chain reaction (PCR), ***OR***

- Significant rise in serum varicella immunoglobulin G (IgG) antibody level by any standard serologic assay

SURVEILLANCE CASE DEFINITIONS

- *Confirmed:*
  - An acute illness with diffuse (generalized) maculo-papulovesicular rash, ***AND***
    - Epidemiologic linkage to another probable or confirmed case, ***OR***
    - Laboratory confirmation by any of the following:
      - Isolation of varicella virus from a clinical specimen, ***OR***
      - Varicella antigen detected by direct fluorescent antibody test, ***OR***
      - Varicella-specific nucleic acid detected by polymerase chain reaction (PCR), ***OR***
      - Significant rise in serum anti-varicella immunoglobulin G (IgG) antibody level by any standard serologic assay.

- *Probable:* An acute illness with
  - Diffuse (generalized) maculo-papulovesicular rash, ***AND***
  - Lack of laboratory confirmation, ***AND***
  - Lack of epidemiologic linkage to another probable or confirmed case.

EPIDEMIOLOGY AND TRENDS

In 2013, 456 (217 confirmed and 239 probable) cases of varicella (chickenpox) were reported in Kansas. Varicella has been a reportable disease since 2003 in Kansas—previously, only deaths resulting from varicella were reportable. Two outbreaks were reported, accounting for 116 (53%) of the confirmed cases. Both outbreaks occurred in a school setting.

One of the varicella outbreaks occurred in Shawnee County in a childcare center. Five cases were identified in the center. Ages ranged from 7 months - 3 years old. All cases met clinical case definition with a maculo-papulovesicular rash and were epidemiologically linked. Four of the five cases were not vaccinated due to being younger than 12 months. The one case that was vaccinated received minor rashes of less than 50 lesions, while the unvaccinated cases had moderate rashes of 249-500 lesions.

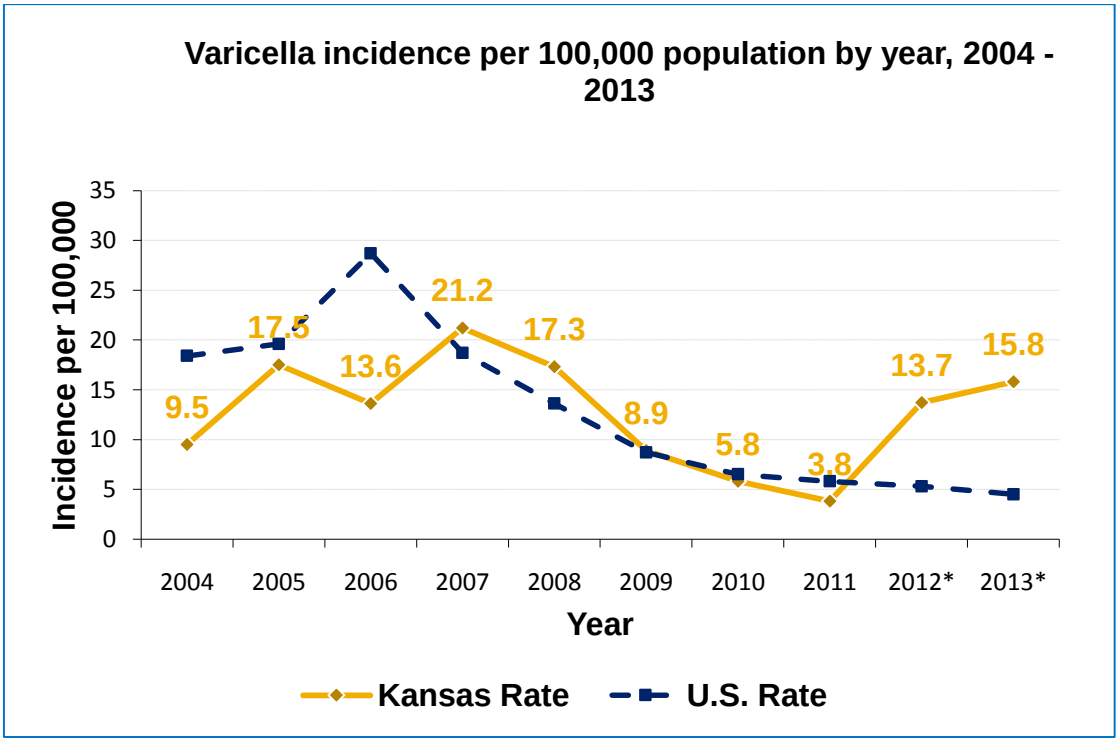
The second reported outbreak occurred in four counties, with the majority of the cases occurring in Pottawatomie County. The outbreak was identified in a household that attended the same church with other cases. Ages of cases ranged from 1 to 15 years of age, with a median age of 5 years. One-hundred and three (93%) cases of the total 111 confirmed cases were unvaccinated. The reasons for not being vaccinated were being too young (7%), history of varicella disease (3%), or parents refused or claimed religion exemption (88%).

The vast number of varicella case reports received by KDHE precluded exhaustive investigation of every case; as a result, some cases may have been reported as “probable” rather than “confirmed”. For example, a case may be counted as "confirmed" if it is linked to another infected person, but this link may not be revealed without intensive follow-up. Unlinked, non-laboratory-confirmed cases were counted as “probable” cases—239 probable cases were reported during 2013.

Of the 456 confirmed and probable cases, transmission setting was known for 248 cases (54%). The most common transmission setting reported was “home,” which accounted for 133 cases (54%). School and places of worship were also commonly reported with 35% and 30% of cases reporting these locations as transmission settings. Sixty-nine (28%) records listed multiple transmission settings.

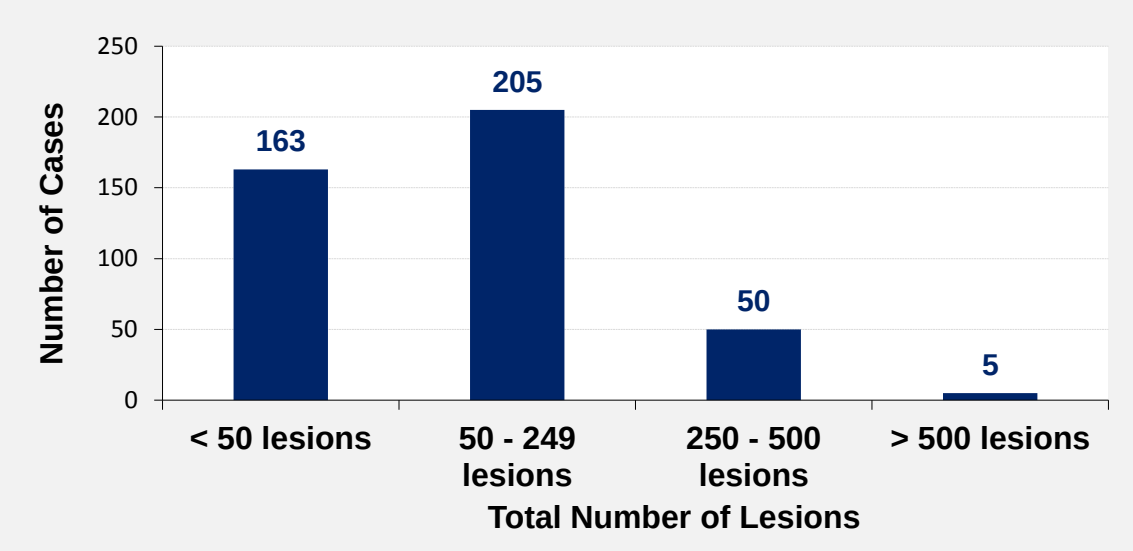
Confirmed and Probable Cases: 456

Kansas incidence per 100,000 population (2013):	15.76
U.S. incidence per 100,000 population (2013):	4.62



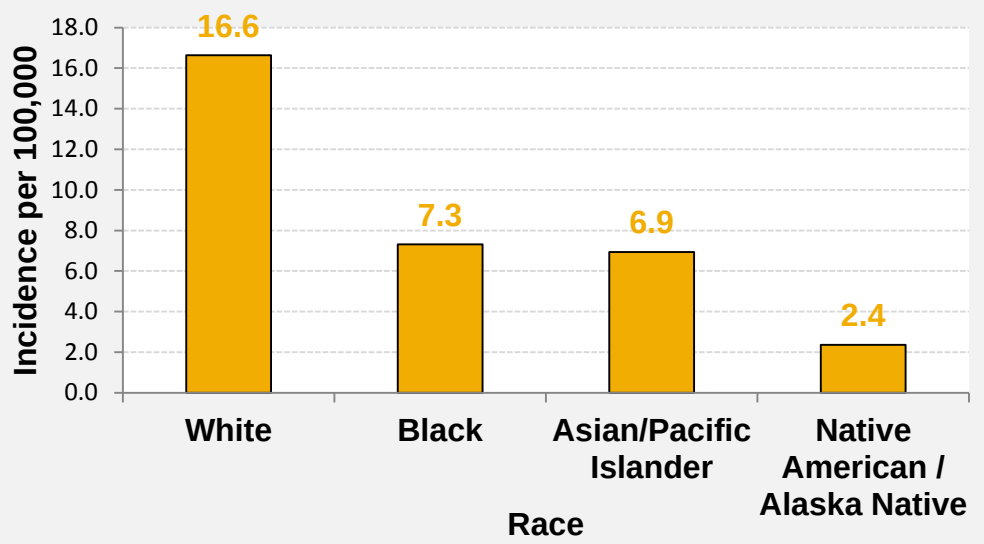
**** Kansas incidence includes confirmed and probable cases***

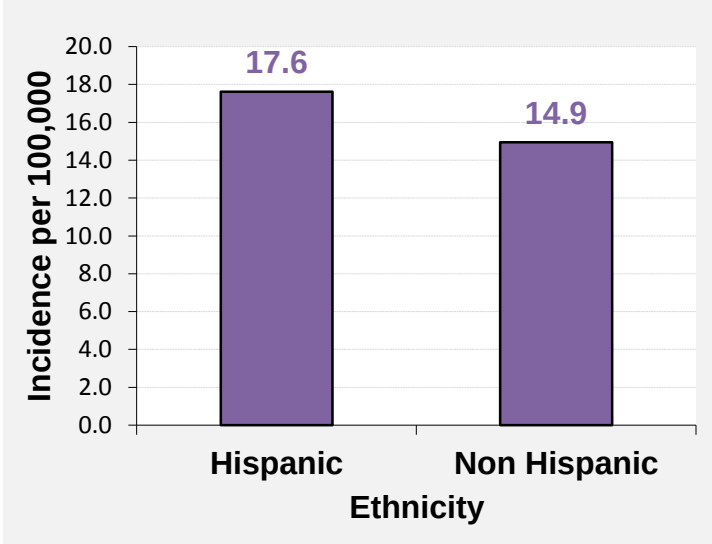
Varicella cases reported by total number of lesions, Kansas, 2013 (n=423)*

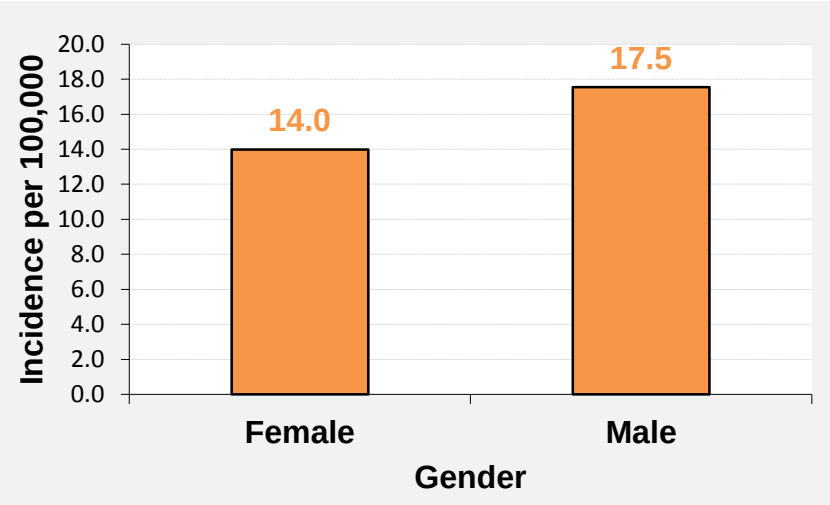


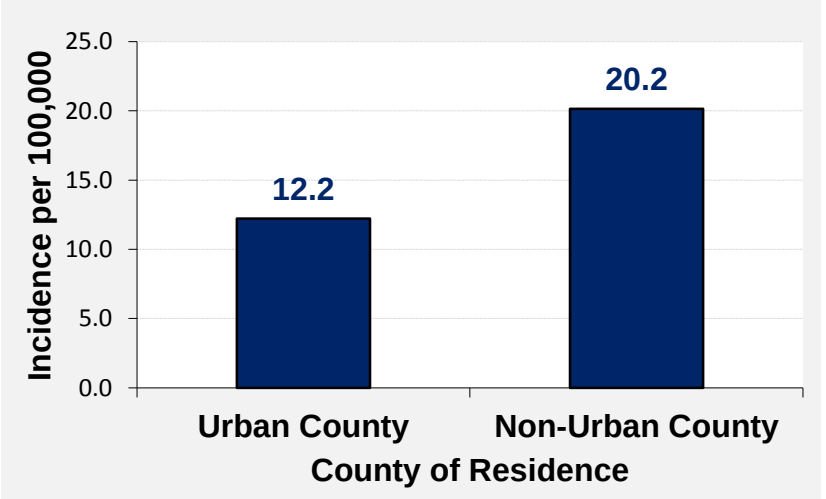
** Total number of lesions unknown for 33 cases*

Varicella incidence per 100,000 population, Kansas, 2013

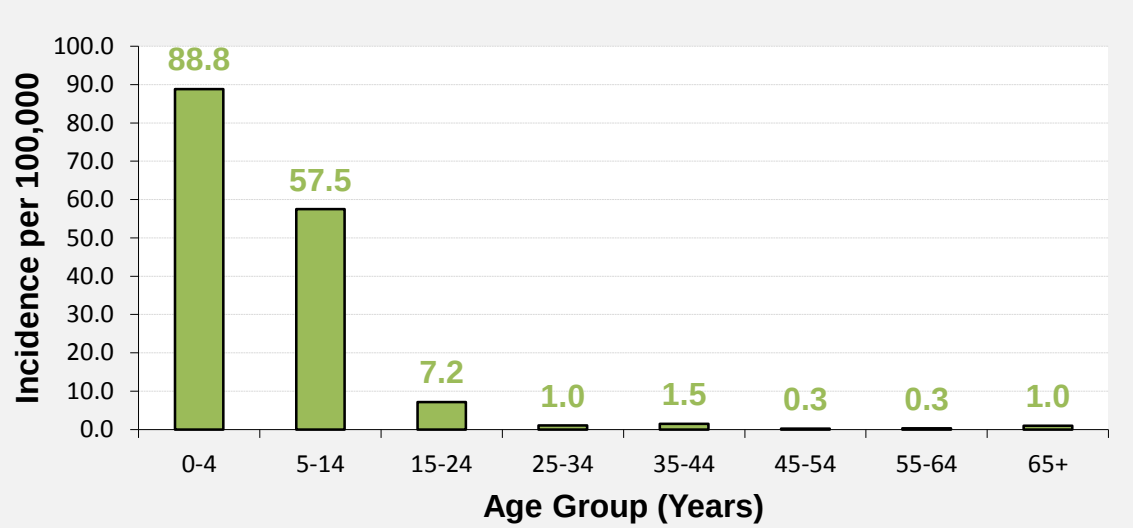




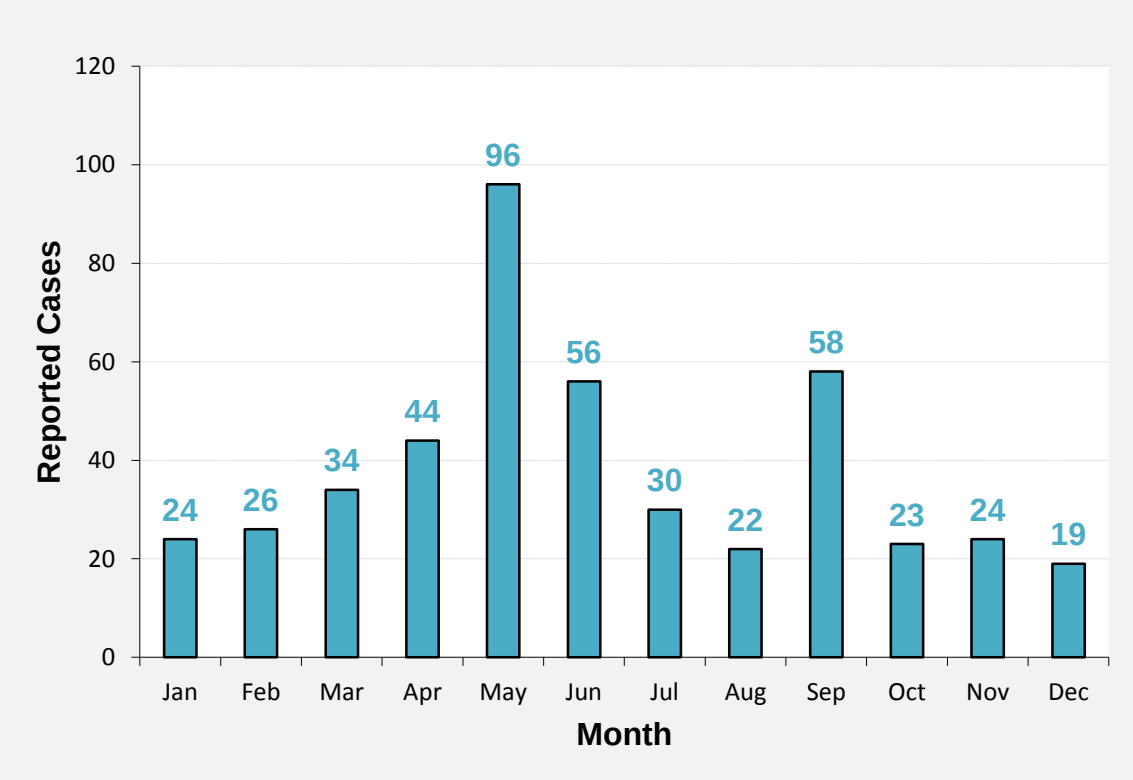




Varicella incidence per 100,000 population
Kansas, 2013



Varicella cases per month
Kansas, 2013



SECTION II: SPECIAL SURVEILLANCE PROJECTS

KANSAS INFLUENZA SURVEILLANCE, 2013-2014

INTRODUCTION

Influenza is not a nationally notifiable disease, nor is it a notifiable disease in Kansas. Because patient-level data is not reported to state health departments or to the Centers for Disease Control and Prevention (CDC), the burden of disease must be tracked through non-traditional methods. Influenza surveillance in Kansas consists of four components that provide data on outpatient influenza-like illness, influenza viruses, and influenza-associated deaths.

MORBIDITY SURVEILLANCE FROM THE U.S. OUTPATIENT INFLUENZA-LIKE ILLNESS SURVEILLANCE NETWORK (ILINET)

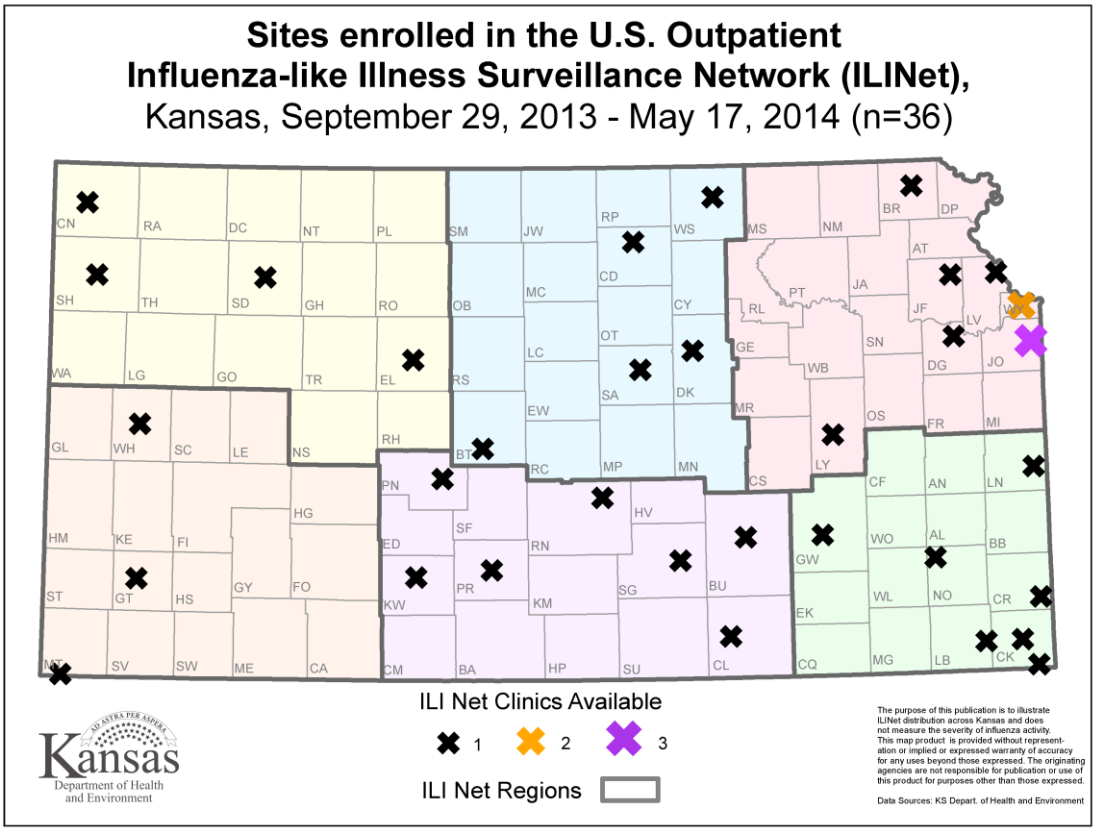
The U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet) is a collaboration between the CDC and state, local, and territorial health departments. The purpose of the surveillance is to track influenza-like illness (ILI), recognize trends in influenza transmission, determine the types of influenza circulating, and detect changes in influenza viruses. Influenza-like illness is defined by the CDC as fever (≥100°F or ≥37.8°C, measured either at the ILINet site or at the patient's home) with cough and/or sore throat, in the absence of a known cause other than influenza.

The Bureau of Epidemiology and Public Health Informatics (BEPHI) at the Kansas Department of Health and Environment (KDHE) recruited health care providers throughout Kansas to participate in ILINet. Each week, ILINet site personnel determined the total number of patients seen with ILI during the previous week by age group — preschool (0-4 years), school age through college (5-24 years), adults (25-49 years and 50-64 years), and older adults (>64 years). In addition, the total number of patients seen during the previous week for any illness was recorded. This data was submitted to the CDC via the internet or fax; sites are asked to report the previous week's data by 11:00 AM each Tuesday.

When the surveillance period began during the week ending October 5, 2013, 39 health care providers were enrolled in ILINet. Three sites dropped out during the week ending November 9, 2013. As a result, the 2013-2014 surveillance data was collected from 36 sites throughout the

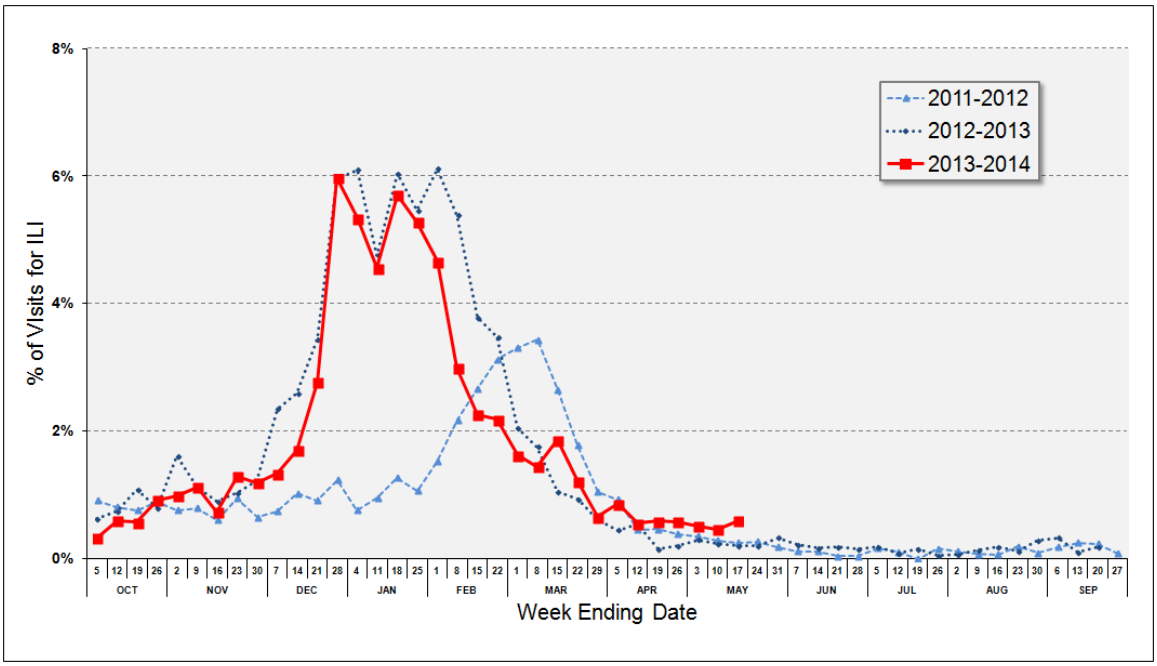
state: 19 family practice clinics, nine hospital emergency departments, four university student health centers, and four pediatric clinics (Figure 1).

Figure 1. Sites enrolled in the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet), Kansas, September 29, 2013 - May 17, 2014 (n=36)



During the influenza surveillance period, starting September 29, 2013 (week 40) and ending May 17, 2013 (week 20), sites observed a total of 216,479 patients—4,074 (1.9%) sought care for ILI. The rate of ILI rose steadily from November 2013 through January 2014. The ILI rate peaked at 6.0% during the week ending December 28, 2013. Typically, ILI in Kansas has peaked in December, January, or February. The rate of ILI dropped below 1% during the week ending March 29, 2014 and remained low through the end of the surveillance period.

Figure 2. Percentage of visits for influenza-like illness (ILI) reported by ILINet sites, Kansas, October 2013 – May 2014 and previous two surveillance periods*



**ILINet sites may vary in number and type (student health, family practice, etc.) each season. Data from the previous two surveillance years are plotted according to week number corresponding to the 2013-2014 week ending date; for example, week 40 of 2013 ended October 5, 2013, week 40 of 2012 ended October 6, 2012, and week 40 of 2011 ended October 8, 2011.*

LABORATORY SURVEILLANCE

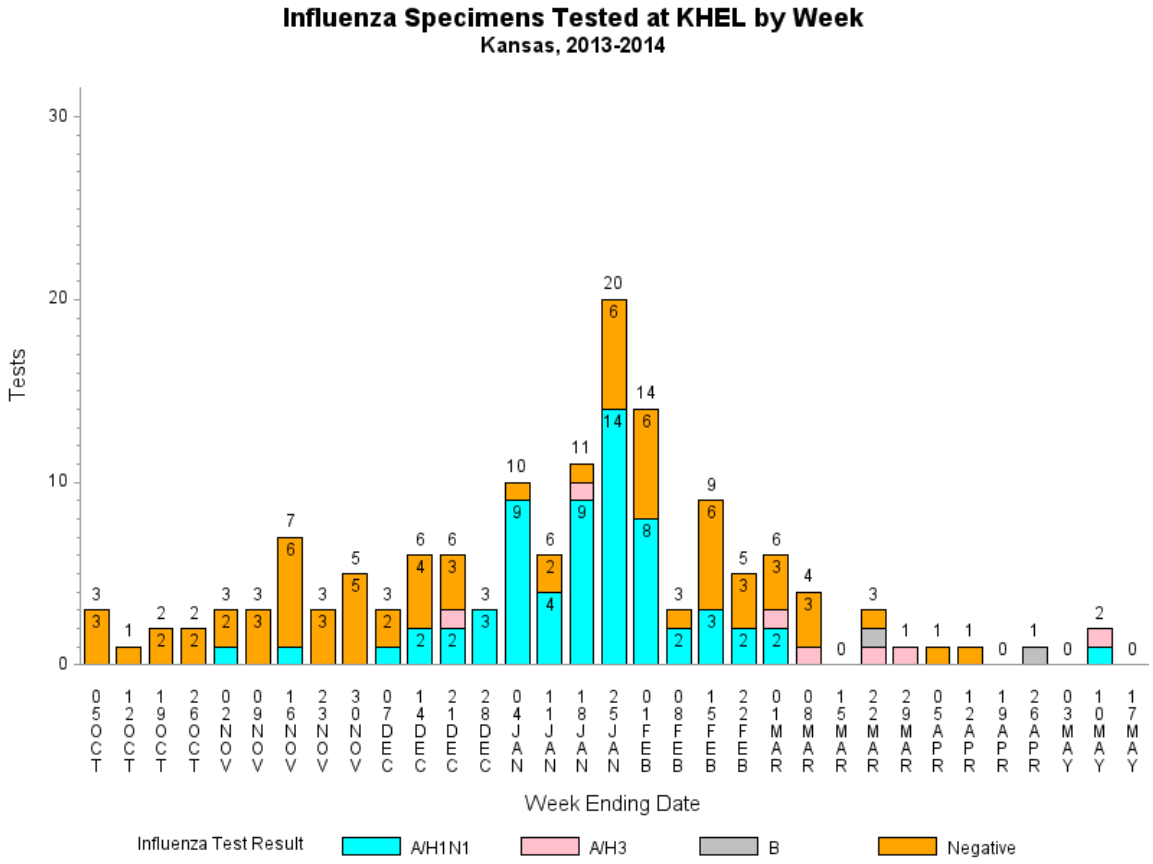
The Kansas Health and Environmental Laboratories (KHEL) provided confirmatory testing for ILINet site patients with ILI, as well as for hospitalized patients throughout the state. Real-Time Polymerase Chain Reaction (RT-PCR) tests were used to analyze nasal and nasopharyngeal swabs for the presence of influenza virus. Laboratory data was sent weekly to CDC by KHEL. In addition, KHEL forwarded a subset of its specimens to CDC for subtyping, antigenic characterization, and antiviral resistance testing.

From October 1, 2013, when the first respiratory specimen for influenza testing was received, until May 17, 2014, when the 2013-2014 surveillance period ended, KHEL tested 144 specimens for influenza. ILINet sites submitted 131 (91%) specimens; the remainder was primarily submitted by hospitals. Influenza was detected in 73 (50%) of the specimens. Both influenza type A and B viruses were detected. Two influenza A subtypes, A/H1 and A/H3, were seen. The influenza A/H1 subtype was most frequently detected, representing of 88% of all positive specimens (Table 1, Figure 3).

Table 1: Laboratory-confirmed influenza viruses by subtype, Kansas, October 1, 2013 – May 17, 2014 (n=73)

Influenza subtype	Number	Percent of Total
A/H1	64	88%
A/H3	7	10%
B	2	3%

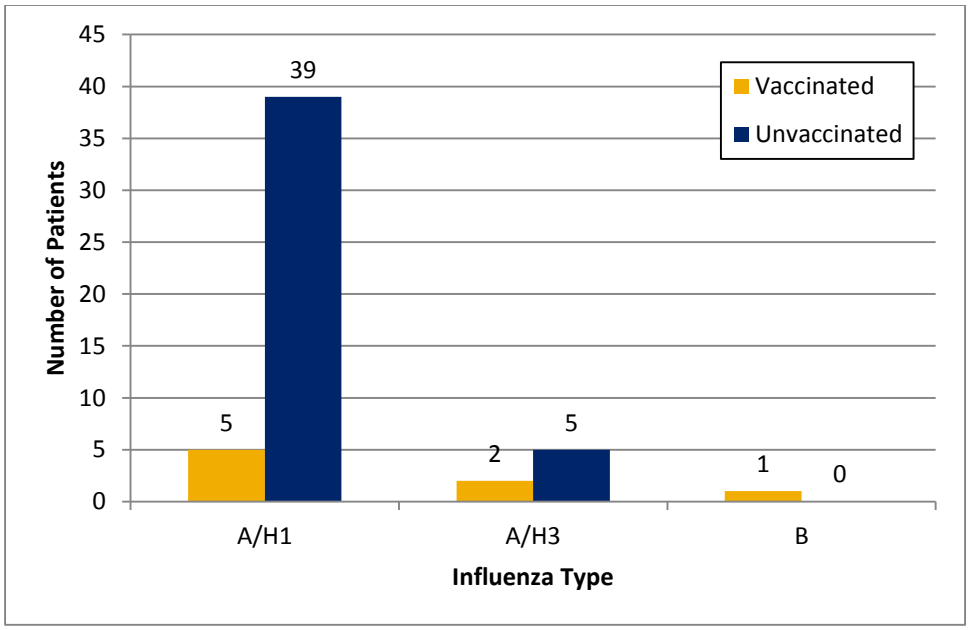
Figure 3: Influenza specimens tested at Kansas Health and Environmental Laboratories by week ending date, October 5, 2013 – May 17, 2014 (n=144)



Antigenic characterization testing performed on influenza isolates submitted by all states to the CDC showed that 71% of the B isolates, 95% of the A/H3 isolates, and 99% of the A/H1 isolates matched their corresponding components in the 2013-2014 seasonal influenza vaccine. KHEL sent 34 positive influenza specimens to CDC for antigenic characterization; all 34 specimens were found to be similar to the vaccine strains: A/California/7/2009-like, A/Texas/50/2012-like, and B/Massachusetts/02/2012-like.

Influenza vaccination status was known for 52 of the 73 RT-PCR-positive patients. Of the 44 patients who tested positive for A/H1 with a known vaccination status, 39 (89%) were unvaccinated, while 5 (11%) were vaccinated. Of the 7 patients who tested positive for A/H3 with a known vaccination status, 5 (71%) were unvaccinated, and 2 (29%) were vaccinated. And lastly, only 1 patient who tested positive for influenza B had a known vaccination status and was vaccinated (Figure 4).

Figure 4: Influenza RT-PCR-positive patients by vaccination status and influenza type, September 30, 2013 - May 17, 2014 (n=52)



LUMINEX RESPIRATORY VIRAL PANEL TESTING

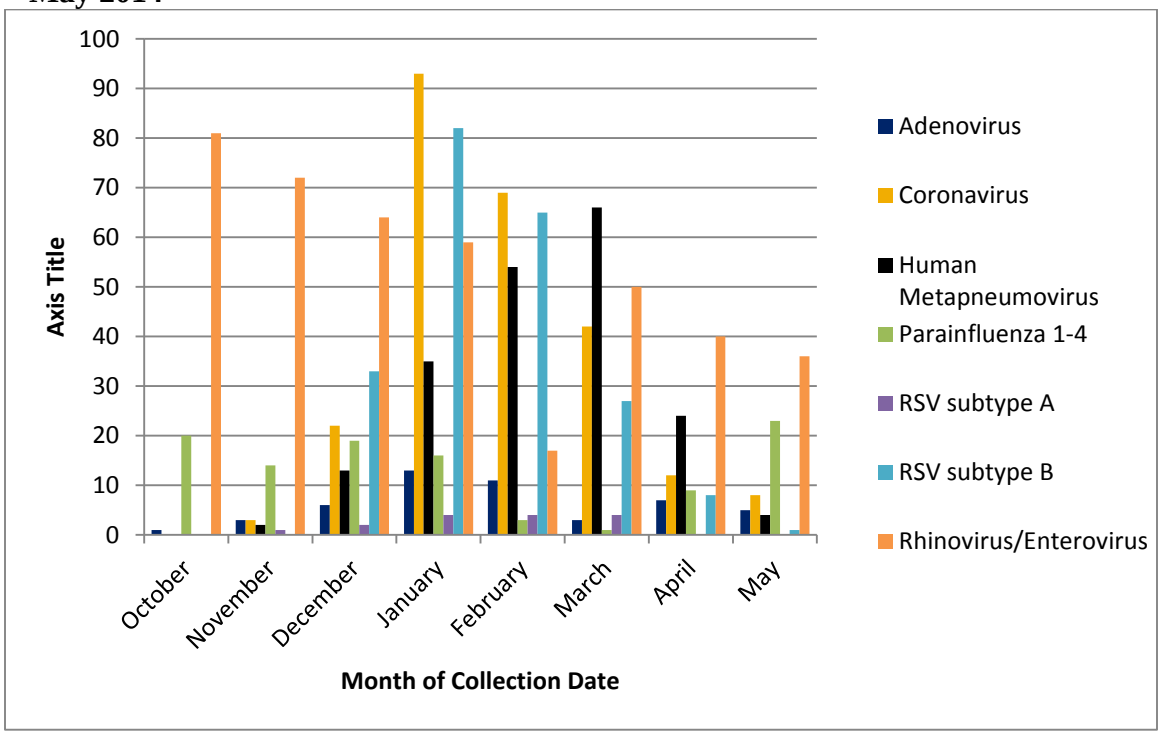
A subset of specimens which test negative for influenza by RT-PCR at the Kansas Health and Environmental Laboratories (KHEL) were tested using the Luminex PCR instrument. The Luminex assay probed for the following 12 viral targets per specimen: influenza A, influenza A subtype H1, influenza A subtype H3, influenza B, respiratory syncytial virus subtype A, respiratory syncytial virus subtype B, parainfluenza 1, parainfluenza 2, parainfluenza 3, human metapneumovirus, rhinovirus, and adenovirus. The goal of Luminex testing was to better understand which respiratory viruses were circulating in Kansas during influenza season.

For the 2013-14 season, Via Christi Laboratories in Sedgwick County shared its RVP data with KDHE. Via Christi Laboratories' RVP can detect Parainfluenza 4 and four different coronaviruses in addition to the 12 targets in the RVP panel used by KHEL; RVP results were sent to KDHE monthly and represented the majority of respiratory virus surveillance in the south central region of Kansas. The resources available at KHEL focused on the remaining five regions of the state.

A total of 43 specimens were tested on the KHEL Luminex assay, 31 of which were negative for all viral targets. Rhinovirus was the most common virus found (n=8). The other viruses identified using Luminex included human metapneumovirus (n=2) and adenovirus (n=1). The KHEL RVP specimens showed no time-specific disease trends over this surveillance period.

Via Christi saw many respiratory virus trends during the flu season (Figure 5). The most common virus found was rhinovirus/enterovirus, which declined throughout the season. They also reported high numbers of RSV subtype B and coronaviruses during peak flu season. Other viruses detected were adenovirus, RSV subtype A, human metapneumovirus, and parainfluenzas.

Figure 5: Positive Respiratory Viral Panel Results, Via Christi Laboratories, October 2013 – May 2014



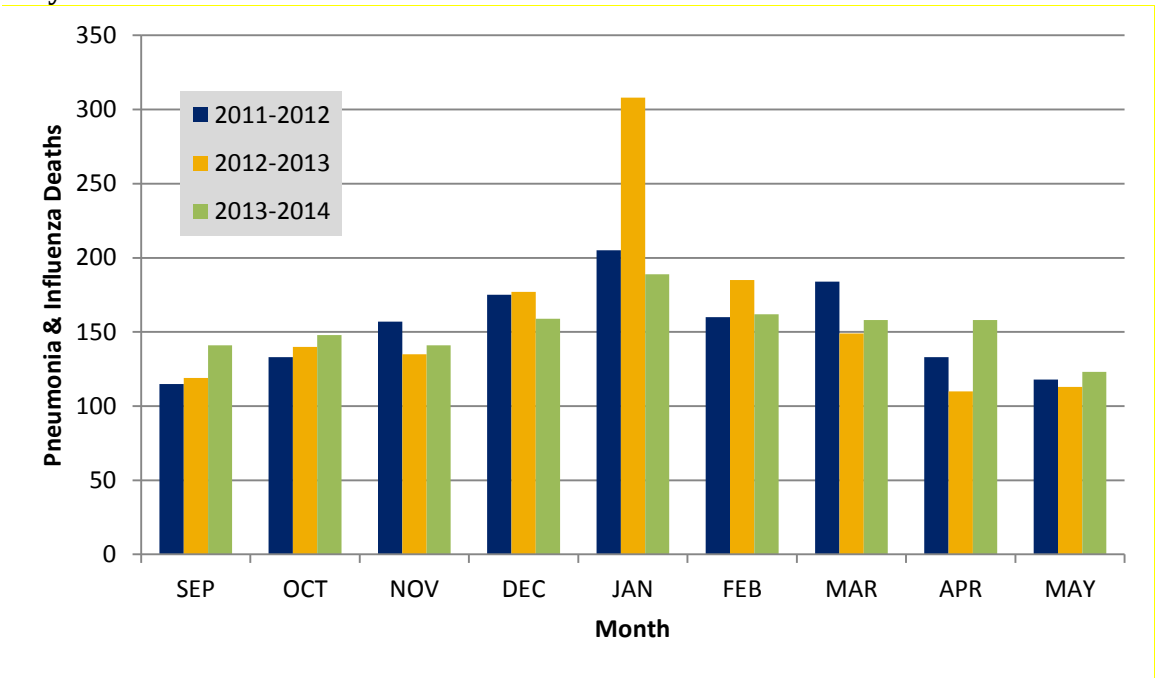
**Via Christi Laboratories uses an RVP panel to test patient specimens, which can detect Parainfluenza 4 and four different coronaviruses in addition to the 12 targets in the RVP panel used by the Kansas Health and Environmental Laboratories.*
Via Christi Laboratories tests specimens from patients seen at Via Christi hospitals as well as specimens from AMS Reference Laboratory. RVP results are sent to KDHE monthly and will represent the majority of respiratory virus surveillance in the south central region of Kansas.

Pneumonia and Influenza (P&I) Mortality

BEPHI monitored influenza-related mortality. Death certificate data was collected to determine the number of deaths caused by pneumonia or influenza (P&I). Mortality was divided among three categories: pneumonia or influenza recorded as a contributing factor of death, influenza recorded as the direct cause of death, and pneumonia recorded as the direct cause of death.

Traditionally, P&I mortality data includes deaths that occurred from September through May. During the 2013-2014 period, the largest number of P&I deaths (n=189) were recorded in the month of January (Figure 6).

Figure 6: Deaths attributed to pneumonia or influenza by month, Kansas, September 2011-May 2014*

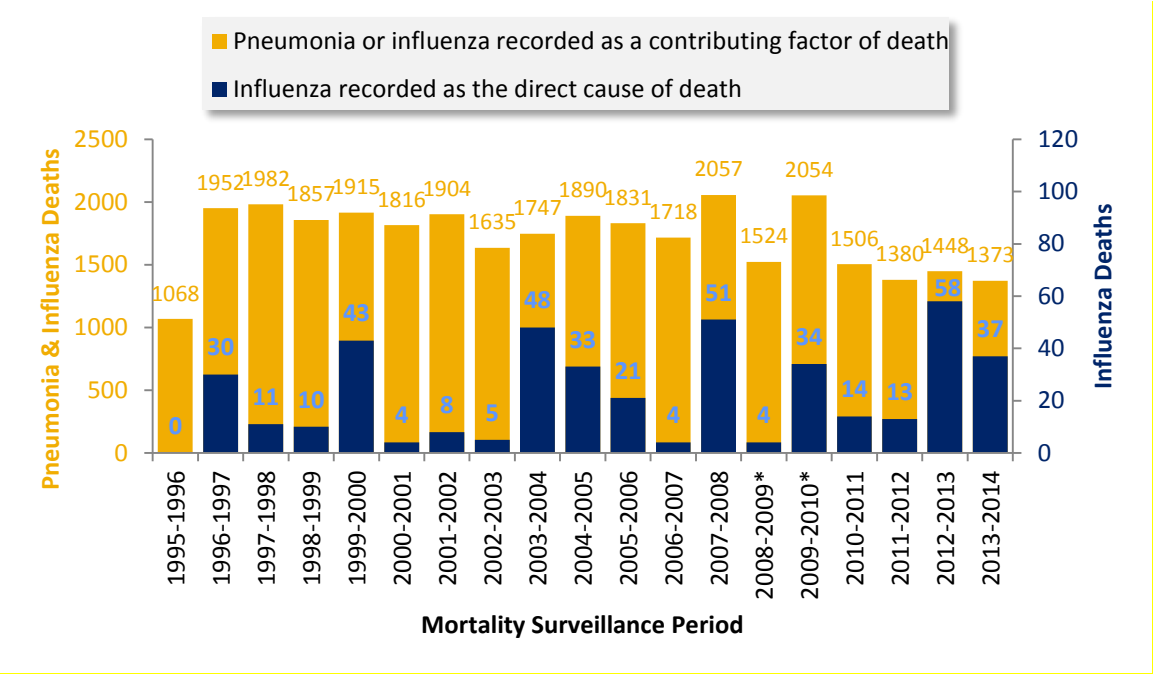


** 2013-2014 data is provisional and subject to change.*

A total of 1,373 deaths occurred during the 2013-2014 surveillance period. The observed mortality was below the 19-year median of 1,816 (Figure 7). During the 2013-2014, 36 deaths were directly attributed to influenza—this number was above the 19-year median (14 deaths) observed since the 1995-1996 surveillance period, and above the 19-year mean (22 deaths).

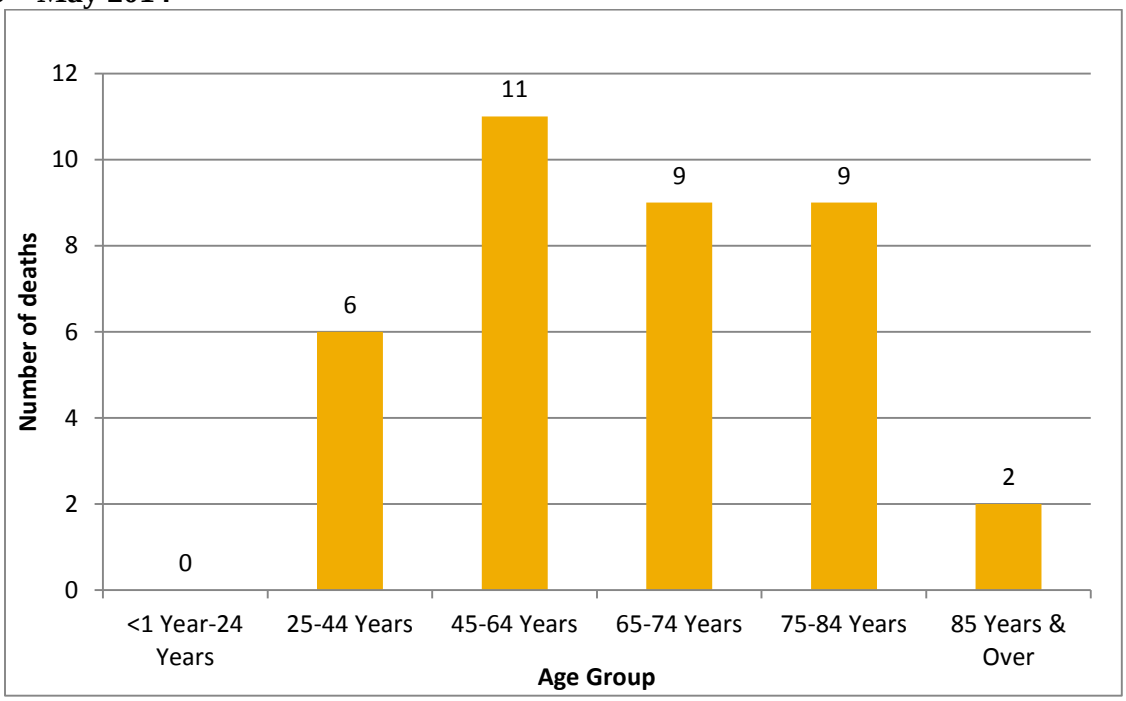
Of the total number of P&I deaths (n=1,373) recorded during the 2013-2014 surveillance period, 37 (3%) were directly attributed to influenza. The majority of these deaths occurred in individuals aged 75 years or older with 11 deaths (30%) (Figure 8).

Figure 7: Pneumonia and influenza mortality by surveillance period, Kansas, 1995-2014 *



**Each influenza season begins September 1 and ends May 31 of the following year, with the exception of 2008-2009 (September 1, 2008 through April 30, 2009) and 2009-2010 (May 1, 2009 through May 31, 2010). This time shift is due to the emergence of pandemic H1N1 in May 2009. The 2013-2014 data is provisional and subject to change.*

Figure 8: Influenza recorded as direct cause of death by age group, Kansas, September 2013 – May 2014



INFLUENZA-ASSOCIATED PEDIATRIC MORTALITY

Since 2004, CDC has requested information on influenza-associated pediatric deaths; the condition was added to the list of reportable diseases in Kansas in 2006. For surveillance purposes, pediatric deaths were considered influenza-related if there was no period of complete recovery between the clinically compatible illness and death, and if the diagnosis was confirmed to be influenza by an appropriate laboratory or rapid diagnostic test.

During the 2013-2014, two confirmed influenza-associated pediatric deaths were reported in Kansas.

INFLUENZA VACCINE COVERAGE

The CDC's Advisory Committee on Immunization Practices (ACIP) recommended all individuals older than six months of age be immunized against influenza. For the 2013-2014 season, the ACIP stressed vaccination among the following groups at high risk for influenza complications:

- All children aged 6 months through 4 years (59 months)
- All persons aged 50 years and older
- Adults and children who have chronic pulmonary (including asthma), cardiovascular (except hypertension), renal, hepatic, neurologic, hematological or metabolic disorders (including diabetes mellitus)
- Adults and children who have immunosuppression (including immunosuppression caused by medications or by human immunodeficiency virus)
- Women who are or will be pregnant during the influenza season
- Children and adolescents (6 months - 18 years of age) receiving long-term aspirin therapy who therefore might be at risk for experiencing Reye syndrome after influenza virus infection
- Residents of nursing homes and other long-term care facilities
- American Indians and Alaska Natives
- Persons who are morbidly obese (BMI $\geq$40)
- Health-care personnel
- Household contacts and caregivers of children aged <5 years and adults aged 50 years and older, with particular emphasis on vaccinating contacts of children aged <6 months
- Household contacts and caregivers of persons with medical conditions that put them at higher risk for severe complications from influenza

Vaccine coverage levels were measured by the Kansas Behavioral Risk Factor Surveillance System (BRFSS). Self-reported vaccine coverage levels reported from the BRFSS questionnaire are shown in Table 4. The coverage levels among other priority groups were not examined. The 2013 influenza immunization rate among individuals 18 years and older was 42.2%.

Table 4: Percentage of Kansans reporting intramuscular or intranasal influenza vaccination during the past 12 months, 2013 BRFSS

Group	% Vaccinated
Age 18 and older	42.2%
Age 50 and older	54.0%
Age 65 and older	64.8%
Adults with asthma	47.4%
Adults with diabetes	57.5%

The influenza vaccine coverage rates measured by the 2013 BRFSS are complex. The survey, conducted throughout the 2013 calendar year, asked if respondents have received a flu vaccine within the past twelve months. In effect, this measured the coverage rate from January 2012 through December 2013. If the respondent was interviewed from January 2013 to the summer of 2014, his or her vaccine was administered for the 2012-2013 influenza season; if the interview was conducted during the fall of 2013, the vaccine may have been administered in anticipation of the 2013-2014 season. The 2013 BRFSS results, then, measured the coverage rate for portions of two vaccination campaigns, rather than only the 2013-2014 season.

SUMMARY

The ILI rate peaked in Kansas at 6.0% during the week ending December 28, 2013. During the 2012-13 season, the ILI rate peaked at 6.1% and the peak during the 2011-12 season was 3.4 %. Three influenza viruses were detected in Kansas: A/H1, A/H3, and B. The predominant strain in Kansas and the U.S. was A/H1.

Testing conducted by the CDC indicated that nearly all circulating influenza viruses were antigenically similar to the components of the 2013-2014 influenza vaccine; however, 8 of 52 patients tested at KHEL were RT-PCR-positive despite receiving the vaccine. The reasons for these vaccinated cases was not clear. Vaccine effectiveness can vary according to the age and health of the individual, as well as the vaccine's correlation to circulating influenza strains. Additionally, it can take up to two weeks after vaccination to develop antibodies against influenza viruses.

During the 2013-14 influenza season, 37 deaths were directly attributed to influenza. Of those deaths, 30% were among those 75 years and older.

ARBOVIRAL DISEASE SURVEILLANCE — KANSAS, 2013

BACKGROUND

West Nile virus is an arbovirus (arthropod-borne virus) most commonly spread by infected mosquitoes. West Nile virus was first identified in the United States in 1999 and spread throughout the United States. Natural transmission involves a mosquito-bird-mosquito cycle; animals such as humans and horses do not circulate enough virus to re-infect a blood-feeding mosquito, and thus are referred to as "dead-end" or "accidental" hosts. Several species of mosquitoes are responsible for transmission of arboviruses but *Culex* species are the primary vector for West Nile virus in the United States.

The incubation period for arboviral infections vary. The incubation period for West Nile virus ranges from 3 to 15 days with an average incubation period of approximately one week. Arboviral infections may be asymptomatic or may result in illness of variable severity. Approximately 80% of people who become infected with West Nile virus do not develop any symptoms[1]. About one in five people who are infected develop a fever with other symptoms such as headache, body aches, joint pains, vomiting, diarrhea, or rash[1]. Most people with 'West Nile virus Fever' recover completely but fatigue and weakness can last for weeks or months[1]. Less than 1% of people who are infected develop a serious neurological illness, such as encephalitis or meningitis, and approximately 10% of people who develop this kind of an infection will die[1].

From 1999 – 2012 there were a total of 39,557 cases and 1,668 deaths in the United States from West Nile virus[2]. During 2012 the United States experienced the second highest number of cases since 2002, with 5,674 confirmed and probable cases reported to the Centers for Disease Control and Prevention[2]. The number of cases declined sharply in 2013 with a 56.5% reduction in cases reported to CDC[2]. However, Kansas had a 63% increase in human cases.

The Kansas Department of Health and Environment (KDHE) began surveillance for West Nile virus (WNV) in 2001 and the first human case was reported in Kansas in 2003. This surveillance system has three main components: mosquito surveillance, human surveillance, and reporting the results to public health partners.

METHODS

MOSQUITO COLLECTION

Mosquito surveillance was conducted weekly from June 13 to October 24, 2013 by Dr. Christopher Rogers with the Kansas Biological Survey. Surveillance was conducted in Sedgwick County, where human cases have been reported most frequently in Kansas. The traps were placed where mosquito arbovirus transmission was most likely to occur. These areas are where large numbers of migratory birds, extensive mosquito habitats, and large human populations coincide.

An Encephalitis Vector Survey (EVS) trap, with dry ice as a carbon dioxide source, was used to collect mosquitoes. These traps typically attract mosquitoes that feed on humans or other mammals. An average of nine traps was set each week in Sedgwick County. The traps were placed at the designated location in the early evening and were collected the following morning.

The contents of the traps were secured in a container and labeled with the address and/or GPS coordinates of the location of the trap. The mosquitoes were transported to the Kansas Biological Survey (KBS) at the University of Kansas for identification.

MOSQUITO IDENTIFICATION

The KDHE contracted with the Kansas Biological Survey (KBS) to enumerate and identify mosquitoes to the species level. Mosquito counts of greater than 1,000 per trap were divided into a smaller subset for identification due to budget constraints. Those mosquitoes identified as potential West Nile virus vectors were submitted to the Kansas Health and Environmental Laboratories (KHEL) via the Douglas County Health Department courier for testing. Results from the enumeration and identification were entered on a Microsoft® Excel® spreadsheet and submitted by KBS to KDHE weekly via e-mail.

WEST NILE VIRUS TESTING OF MOSQUITOES

The West Nile virus vector mosquitoes from each trap location were tested at the Kansas Health and Environmental Laboratories. Mosquitoes were divided into vials containing approximately 50 mosquitoes each and tested for West Nile virus by polymerase chain reaction (PCR). The results were entered in an Excel® spreadsheet and sent to KDHE. All results were posted to KDHE's website and reported to the ArboNET surveillance system. (ArboNET is a national arboviral surveillance system managed by the Centers for the Disease Control and Prevention (CDC) and state health departments.)

HUMAN CASE SURVEILLANCE

West Nile virus, and all other arboviral diseases, is a reportable disease in Kansas. It is a passive surveillance system; healthcare providers or laboratories are required to report cases to KDHE. Cases were classified according to the 2011 CDC case definition (Appendix A). Confirmed and probable cases are reported to CDC and are included as the case count (e.g. confirmed + probable = total number of cases). It is important to note that these definitions are used for case counts only and are not used for clinical diagnosis. In addition, the county in which the person resides is used as the location for surveillance purposes, although they may have been infected elsewhere. Prior to 2011 Kansas only reported confirmed cases therefore we are only able to compare case counts and rates of West Nile virus from 2011-2013.

The cases were entered into EpiTrax, Kansas' electronic disease surveillance system, and the corresponding local health department completed the investigation. The Arboviral Disease Investigation Guideline contains information to provide technical assistance with local surveillance and disease investigation. They contain not only disease-specific information, but also sample letters, reporting forms, sample communication sheets and other tools to assist the local public health department. Once the case investigation is complete, all confirmed and probable cases are reported to the ArboNET surveillance system and the results are posted to the ArboNET website. Information on human West Nile virus case counts and rates can be found in KDHE's annual publication, Reportable Infectious Diseases in Kansas.

We report the incidence rate (number of cases per 100,000 people) of West Nile virus neuroinvasive disease cases for Sedgwick County and compare it to the State of Kansas, the West North Central region (Iowa, Kansas Minnesota, Missouri, Nebraska, North Dakota, and South Dakota), and the United States. We limit our incidence rates to neuroinvasive disease cases as reporting for these cases is believed to be more consistent and complete than for nonneuroinvase disease cases[3].

ANIMAL CASE SURVEILLANCE

West Nile virus infection of animals is not a reportable disease in Kansas. However, positive laboratory results are sent to KDHE as a courtesy from the Kansas Department of Agriculture's Division of Animal Health or the United States Department of Agriculture's Animal and Plant Health Inspection Service. West Nile virus cases in horses may serve as a sentinel of West Nile virus activity in Kansas. Kansas does not conduct surveillance of dead birds for West Nile virus.

MOSQUITO CONTROL

Sedgwick County Health Department and the City of Wichita worked together in an effort to educate citizens, control mosquitoes, and decrease the risk of West Nile virus transmission in Sedgwick County. The Sedgwick County Health Department developed palm card highlighting the three 'D's of prevention; drain, dress, and DEET (Appendix B). Code Enforcement Officers with the Metropolitan Area Building and Construction Department (MABCD), handed out the West Nile virus palm cards to citizens as they conducted inspections throughout the city of Wichita and Sedgwick County. The Sedgwick County Extension Master Gardeners and Extension Agents also distributed the palm cards.

In response to dramatically increasing numbers of vector mosquitoes during the month of August, the City of Wichita deployed mosquito larvicide "dunks" to areas of standing water that were likely breeding locations for these mosquitoes based on surveillance data. The larvicide contained in the dunks is a type of bacteria, *Bacillus thuringiensis israelensis*, or Bti. When the Bti are eaten by mosquito larvae it prevents development into adult mosquitoes. It is non-toxic to other insects, fish, animals, and humans. One dunk treats approximately 100 square feet of water and lasts for 30 days.

EVALUATION OF MEASURES TO PREDICT WEST NILE VIRUS CASES

The Vector Index (VI) is used to quantify potential risk of transmission of West Nile virus from mosquitoes to humans[4]. The VI requires three values to complete the calculation; female vector mosquito presence, vector species density, and vector species infection rate[4]. First, vector density is calculated by the number of female *Culex* (e.g. *C. erraticus, C. pipiens/quinquefasciatus, C. resturans, C. tarsalis*) mosquitoes divided by the number of trap nights each week. Second, the Infection Rate (maximum likelihood estimate of the proportion of WNV infected mosquitoes in pooled samples) is calculated by the number of WNV positive mosquitoes per 1,000 mosquitoes tested[5]. After these measures are obtained the Vector Index (VI) is calculated by multiplying the vector density by the infection rate. All potential WNV mosquito vector species were tested and each pool contained a variety of mosquito species. We estimated the number of *Culex* mosquitoes for each pool and calculated an infection rate and VI using this estimate.

Two- and three-week prevalence estimates of *Culex spp.* and Vector Index were calculated and compared to the number of human cases, both those that occurred in Sedgwick County and those that occurred throughout the entire state. The mean number of *Culex spp*. and Vector Index by two- and three-week prevalence was compared to human cases that occurred at weekly intervals 2, 3, and 4 weeks later.

The correlation between measures was calculated using Pearson's correlation coefficient (R) and a p-value of <0.05 was considered statistically significant.

RESULTS

MOSQUITO SURVEILLANCE

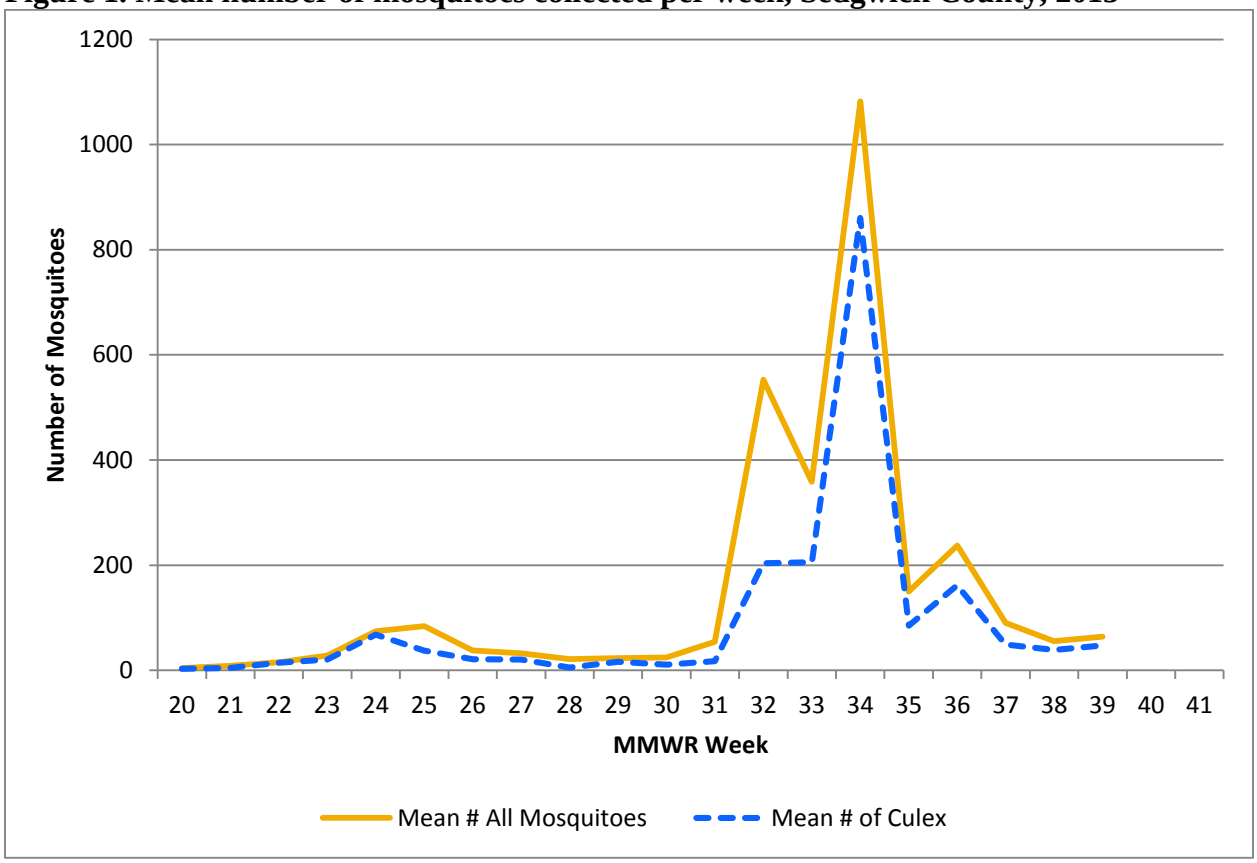
Mosquito Identification

Mosquito collection began on May 14 and continued weekly through September 24, 2013. All identified species (Table 1) have been previously documented in Kansas.

Mosquito Abundance

There was an average of nine trap nights per week during the twenty weeks of surveillance for a total of 179 trap nights. A trap night is calculated by taking the number of traps per night and multiplying it by the number of weeks of surveillance. The median number of mosquitoes collected each week was 495 (range 0 – 9740) and the median number of *Culex* mosquitoes was 100 (range 0 – 7744) (Figure 1). The mean number of *Culex* species (number of mosquitoes divided by the number of traps per week) per trap ranged from 3 – 860.

Figure 1. Mean number of mosquitoes collected per week, Sedgwick County, 2013



There were a total of 26,690 mosquitoes collected. *Culex tarsalis* (35%) *and Culex pipiens/quinquefasciatus* (27%) comprised the majority of mosquitoes collected (Table 1).

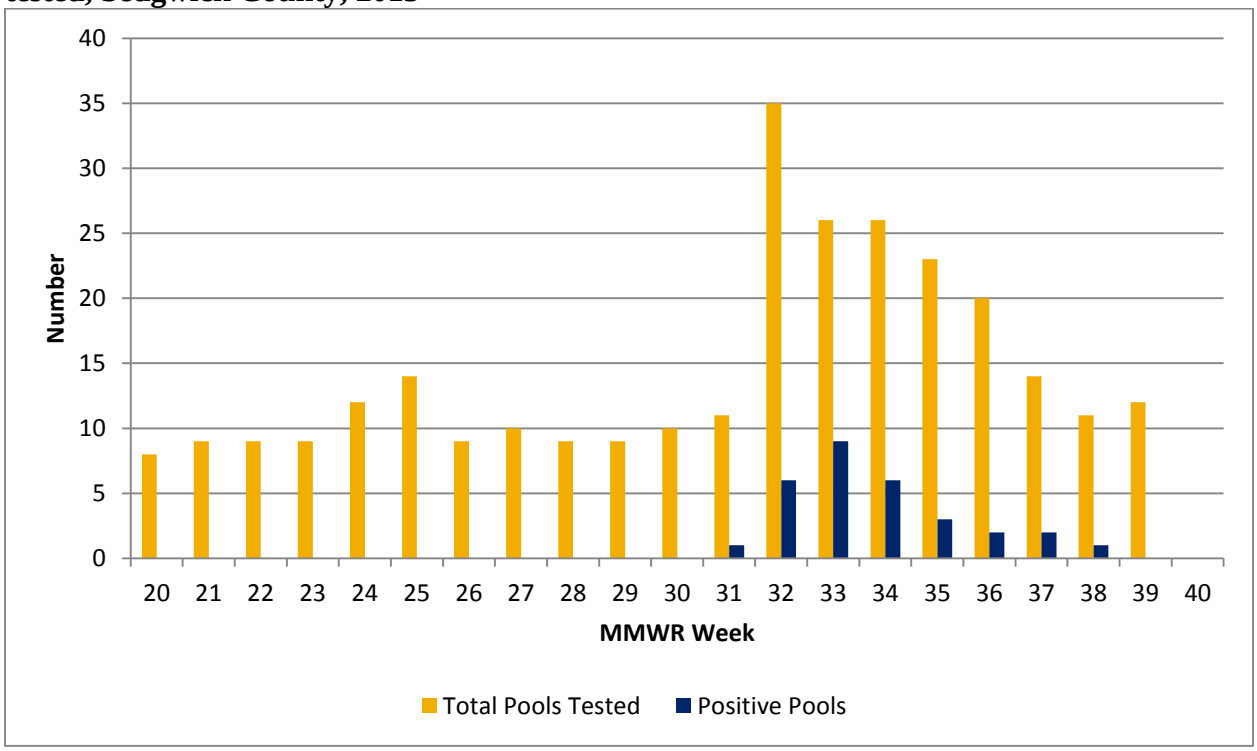
Table 1. Mosquito species collected, Sedgwick County, 2013

Mosquito Species	Number	% Total
Culex tarsalis	9458	35
Culex pipiens/quinquefasciatus	7317	27
Aedes vexans	6683	25
Anopheles quadrimaculatus	1010	4
Aedes albopictus	898	3
Ochlerotatus zoosophus	831	3
Anopheles punctipennis	110	0.4
Culex erraticus	96	0.4
Psorophora cyanescens	95	0.4
Ochlerotatus triseriatus	79	0.3
Psorophora discolor	32	0.1
Culex resturans	27	0.1
Culiseta inornata	17	<0.1
Psorophora columbiae	14	<0.1
Psorophora horrida	8	<0.1
Orthopodomyia signifera	8	<0.1
Psorophora ciliata	3	<0.1
Oclerotatus nigromaculis	3	<0.1
Total	**26690**	

Arboviral Testing

Mosquitoes were pooled for testing by location with up to 50 mosquitoes included per pool. Due to the excessive number of mosquitoes captured during MMWR weeks 33-36 only a subset of mosquitoes were tested. A total of 286 mosquito pools were tested for West Nile virus; 10.5% (30) tested positive for West Nile virus (Figure 2). The first WNV positive pool was collected on July 30th and the last WNV positive pool was collected on September 17th.

Figure 2. Number of West-Nile-virus-positive mosquito pools and total number of pools tested, Sedgwick County, 2013



HUMAN CASE SURVEILLANCE

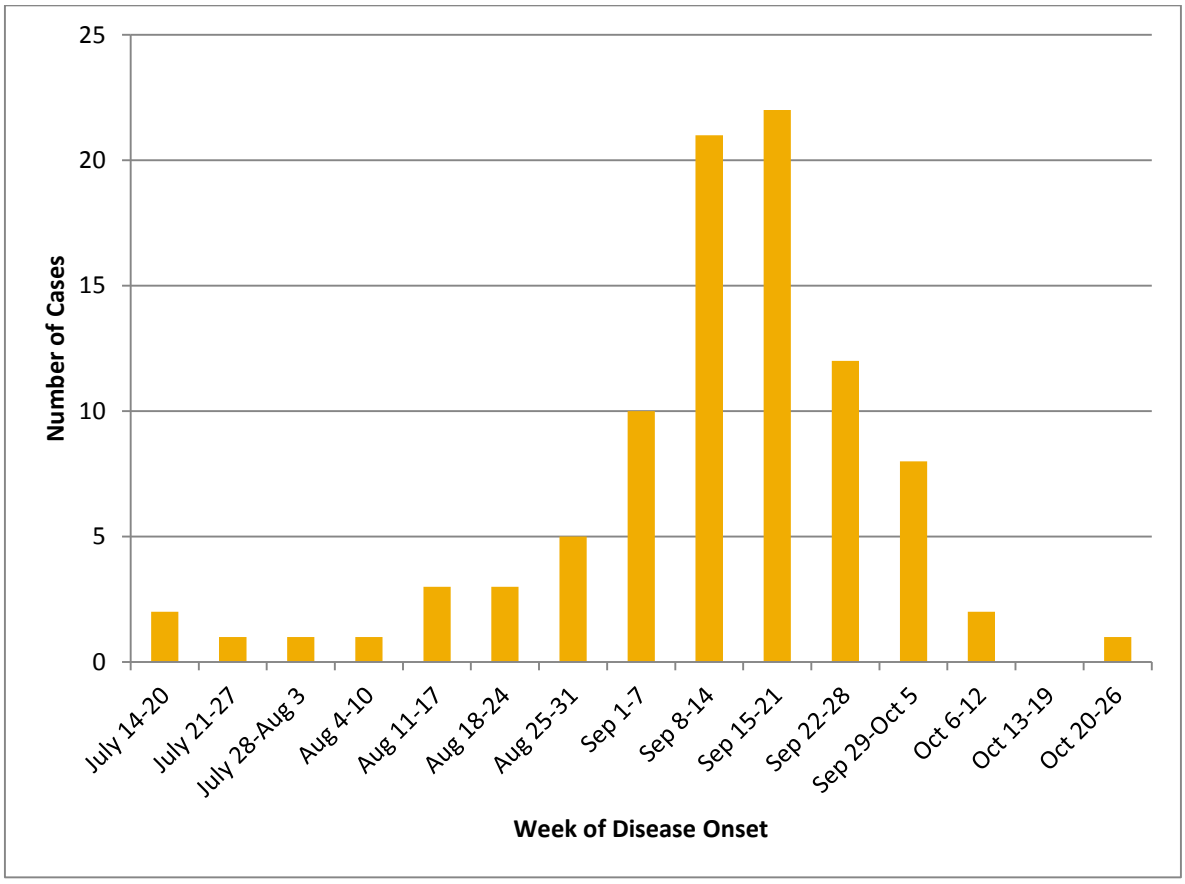
State of Kansas

A total of 92 human cases of West Nile virus were reported in the state of Kansas during 2013 (Table 2). This was a 62.5% increase in cases from 2012 (n= 56). There were five confirmed and 54 probable cases of non-neuroinvasive WNV and 33 probable cases of neuroinvasive WNV. There were no confirmed cases of neuroinvasive WNV. The median age was 59.5 years (range 12 – 85 years). Fifty-six cases (61%) were hospitalized. Eight (9%) deaths were reported. The earliest case became ill in July; the majority (72.8%) of cases had disease onset during September (Figure 3).

Table 2. Human West Nile virus case characteristics, Kansas, 2013 (n=92)

Age (years)		
Median	59.5	
Range	12-85	
	Number of Cases (%)	
Gender		
Male	63	(68)
Female	29	(32)
Month of Disease Onset		
July	3	(3)
August	13	(14)
September	67	(73)
October	9	(10)
Clinical Status		
Neuroinvasive disease	33	(36)
Non-neuroinvasive disease	59	(64)
Hospitalized	56	(61)
Died	8	(9)

Figure 3. Number of Human West Nile virus Cases by Week of Disease Onset, Kansas, 2013.



Sedgwick County

There were 11 cases of West Nile virus in Sedgwick County in 2013. Thirty-six percent (n=4) of these cases were neuroinvasive West Nile virus disease. This was a 60% decrease from the number of West Nile virus neuroinvasive cases reported in 2012. However, the neuroinvasive case rate increased 57% in the State of Kansas and 28% in the West North Central region (Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota) (Table 3).

Table 3. West Nile virus neuroinvasive disease count and incidence rate* by year, 2011-2013

Region	2011		2012		2013	
	Count	*Rate*	*Count*	*Rate*	*Count*	*Rate*
Sedgwick County	0	N/A	10	1.98	4	0.79
Kansas	4	0.14	20	0.69	34	1.14
West North Central†	31	0.15	225	1.08	288	1.38
United States	1,267	0.44	2,873	0.92	486	0.16

**Number of cases per 100,000 population, based on July 1, 2013 U.S. Census population estimates.*
†U.S. Census region, West North Central includes; Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota.

ANIMAL SURVEILLANCE

Animal Case Surveillance

There were eight WNV-positive horses reported to KDHE during 2013. Horses in three counties (Saline, Butler, and McPherson) had specimens collected for WNV testing, and were likely symptomatic, prior to the first human case in each of those counties. Three counties (Sedgwick, Reno, and Leavenworth) reported specimens collected in horses after onset of symptoms in human cases (Table 4). The first horse reported with WNV in Sedgwick County, with a specimen collection on August 28, was symptomatic at the end of July. This was just a few days prior to the onset of symptoms in the first human case in Sedgwick County.

Table 4. Comparison of West-Nile-virus-positive horses with the illness onset date of the first human case per county, Kansas, 2013

County	Date Specimen Collected from Horse with WNV	Symptom Onset Date of County's First Human WNV Case
Saline	August 22	September 20
Butler	August 25	August 31
Sedgwick	August 28	August 1
Sedgwick	September 5	August 1
McPherson	September 9	October 10
Reno	September 13	August 9
Rooks	October 7	No human case
Leavenworth	October 21	September 23

MOSQUITO CONTROL

The City of Wichita deployed 60 dunks within two different areas of standing water in the city on August 23 and August 27 and 45 dunks on August 28. On August 29 a total of 190 dunks were deployed in four additional locations. No adulticiding, or spraying for adult mosquitoes, was performed.

”Fight the Bite” educational campaign materials were developed and distributed in a variety of formats and locations. There were 210 posters distributed to City of Wichita facilities including swimming pools, city halls, and parks. There were 1,080 palm cards distributed by City of Wichita code enforcement personnel and storm water staff, Sedgwick County Extension Master Gardeners and local Extension Agents[6].

EVALUATION OF MEASURES TO PREDICT WEST NILE VIRUS CASES

The mean number of *Culex* mosquitoes per week was calculated using two-week (current week and one week prior) and three-week (current week and two weeks prior) periods of mosquito surveillance data, and compared with the number of human cases, both for Sedgwick County and the state of Kansas, two to four weeks later. There was a strong correlation (R=0.82) between the two-week mean *Culex* prevalence and human cases occurring in Sedgwick County three weeks later. There was also a strong correlation between the two-week mean *Culex* prevalence and human cases occurring throughout the entire state of Kansas three (R=0.65) and four weeks (R=0.95) later. There was a strong correlation between the three-week mean *Culex* prevalence and human cases occurring in Sedgwick County three weeks (R = 0.61) and four weeks (R = 0.77) later. There was also a strong correlation between the three-week mean Culex prevalence and human cases occurring throughout the entire state of Kansas three (R=0.53) and four (R=0.86) weeks later.

We calculated a Vector Index (VI) for those weeks with a WNV positive mosquito pool (MMWR weeks 31-38). The highest VI, 6.6, occurred during week 34 (Table 5). We calculated a two-week (current week and one week prior) and three-week (current week and two weeks prior) VI and compared with the number of human cases, both for Sedgwick County and the state of Kansas, two to four weeks later. There was a weak correlation between the two-week VI and human cases occurring in Sedgwick County two (R = 0.49) and three (R = 0.40) weeks later; however, there was a strong correlation between the two-week VI and human cases occurring throughout the entire state of cases three (R = 0.93) and four (R = 0.63) weeks later. There was a strong correlation (R = 0.78) between the three-week VI and human cases occurring in Sedgwick County two weeks later and human cases occurring throughout the entire state of Kansas two (R = 0.91) and three (R = 0.86) weeks later.

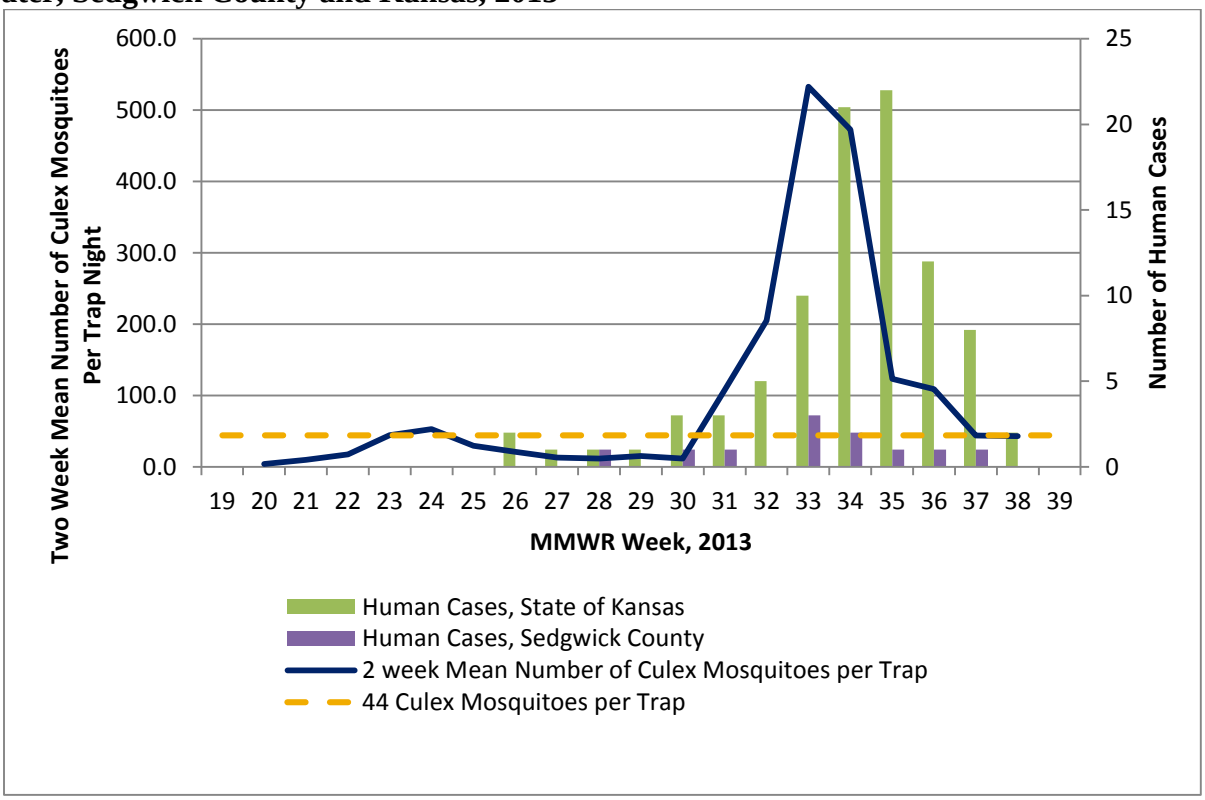
We evaluated the moving two- and three-week *Culex* mosquito prevalence estimate to determine if there was a number at which the mean number of *Culex* mosquitoes could be used to guide mitigation actions. 82% (9/11) of cases occurred three weeks later in Sedgwick County and 89% (81/91) of cases occurred three weeks later throughout the state of Kansas when the two-week mean number of *Culex* mosquitoes per trap was $\geq$44 (Figure 5). There did not appear to be a clear cutoff between the Vector Index values.

Table 5. Vector Index, Sedgwick County, Kansas, 2013*

MMWR Week	Mean Number of *Culex* Mosquitoes	Infection Rate for *Culex* mosquitoes (MLE/1,000)	Vector Index
31	17	9.17	0.16
32	204	0.55	0.11
33	206	5.21	1.07
34	860	7.7	6.63
35	85	4.11	0.35
36	162	3.57	0.58
37	49	5.35	0.26
38	39	2.82	0.11

**No West Nile virus positive mosquitos in MMWR weeks 20-30 and 39.*

Figure 5. Two-Week Mean Culex Mosqutio Prevalence and Human Cases Three Weeks Later, Sedgwick County and Kansas, 2013



DISCUSSION

We changed our mosquito surveillance methodology in 2013 to increase the number of mosquito traps in the county where the highest number of human cases had been reported each year (Sedgwick County). This allowed us to concentrate the number of surveillance sites in a highly populated area, increase the amount of data collected, and attempt to quantify an action level at which mosquito control efforts should occur for public health officials.

There have been several recent peer-reviewed papers that evaluate the utility of mosquito surveillance data to attempt to quantify a measure or measures that can be used to predict human West Nile virus transmission from mosquitoes to humans[7-9]. Although the Vector Index is considered the gold-standard it relies on the outcome of test results from mosquitoes for West Nile virus (or other arboviruses) which can cause, at a minimum, a one to two week delay for prediction of human cases[8]. Due to the extremely high volume of mosquitoes collected during the peak of the season in Sedgwick County, late August through early September, the test results were not available until October and November. This significant and unavoidable delay in West Nile virus testing of mosquitoes rendered the Vector Index measure useless as a tool to predict human cases of West Nile virus and direct mosquito control efforts.

Therefore, we evaluated the utility of the mean number of *Culex* mosquitoes per trap, as the results are consistently available within three business days of collection. Bolling et al conclude that abundance of *Culex tarsalis* females were strongly associated with weekly numbers of West Nile virus disease cases with onset 4-7 weeks later[8]. Drs. Kilpatrick and Pape state that use of a two- or three-week moving window of vector index would alleviate substantial week-to-week variation of the risk index[7]. We applied their methodology to evaluate the utility of a two- and three-week mean *Culex* prevalence per trap night measure to predict human cases. The majority of cases occurred in Sedgwick County and the entire state three weeks after the two-week mean *Culex* prevalence was $\geq$44 *Culex* mosquitoes per trap night. This information can guide Sedgwick County and the City of Wichita officials on the location(s) to concentrate mosquito mitigation efforts and to focus public health messaging to residents of Sedgwick County. In addition, this information can also be used to alert all people in the state of Kansas when the risk of West Nile virus transmission may be increased.

There were at least three limitations of our study. First, we do not know the exact location where case-patients were infected. For the purpose of this study we assume that the case-patient was infected in their county of residence. This may under or overestimate the number of cases in Sedgwick County. Second, we were only able to evaluate one year of data as the sampling methodology changed between 2012 and 2013. Third, we had to estimate the number of *Culex* females per mosquito pool tested for West Nile virus for weeks 33-36 due to the abundance of mosquitoes collected; this may cause the Vector Index to be lower or higher than it actually was.

West Nile virus has been endemic in Kansas since 2003, with annual cases declining until the nationwide outbreak in 2012. From 2012-2013 the number of neuroinvasive West Nile virus cases decreased 83% in the United States; however, Kansas had a 70% *increase* in cases. While Sedgwick County has reported the highest number of cases of neuroinvasive disease in the state, there was a substantial (60%) *decrease* of the number of cases reported from 2012-2013. We believe that this is due, in part, to the targeted larvicidal treatment of mosquito breeding sites

identified through adult mosquito surveillance efforts. We are unable to quantify this outcome as we did not perform mosquito larval surveillance.

Outbreaks of arboviruses, such as West Nile virus, are difficult to predict due to the variety of factors that can influence transmission of this disease including weather (e.g. precipitation and temperature, animal and human host abundance, and human behaviors (e.g. use of repellent, outdoor activity, etc.)[8].

People should take the following precautions to protect against West Nile virus:

When you are outdoors, use insect repellent containing an EPA-registered active ingredient on skin and clothing, including DEET, picaridin, oil of lemon eucalyptus, or IR3535. Follow the directions on the package.
Many mosquitoes are most active at dusk and dawn. Be sure to use insect repellent and wear long sleeves and pants at these times or consider staying indoors during these hours.
Make sure you have good screens on your windows and doors to keep mosquitoes out.
Get rid of mosquito breeding sites by emptying standing water from flower pots, buckets and barrels. Change the water in pet dishes and replace the water in bird baths weekly. Drill holes in tire swings so water drains out. Keep children's wading pools empty and on their sides when they aren't being used.

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APPENDIX A: WEST NILE VIRUS SURVEILLANCE CASE DEFINITION, 2013

CLINICAL CRITERIA FOR SURVEILLANCE PURPOSES

Neuroinvasive disease

- Fever (≥100.4°F or 38°C) as reported by the patient or a health-care provider, ***AND***
- Meningitis, encephalitis, acute flaccid paralysis, or other acute signs of central or peripheral neurologic dysfunction, as documented by a physician, ***AND***
- Absence of a more likely clinical explanation.

Non-neuroinvasive disease

- Fever (≥100.4°F or 38°C) as reported by the patient or a health-care provider, ***AND***
- Absence of neuroinvasive disease, ***AND***
- Absence of a more likely clinical explanation.

LABORATORY CRITERIA FOR SURVEILLANCE PURPOSES

- Isolation of virus from, or demonstration of specific viral antigen or nucleic acid in, tissue, blood, CSF, or other body fluid, ***OR***
- Four-fold or greater change in virus-specific quantitative antibody titers in paired sera, ***OR***
- Virus-specific IgM antibodies in serum with confirmatory virus-specific neutralizing antibodies in the same or a later specimen, ***OR***
- Virus-specific IgM antibodies in CSF and a negative result for other IgM antibodies in CSF for arboviruses endemic to the region where exposure occurred, ***OR***
- Virus-specific IgM antibodies in CSF or serum.

SURVEILLANCE CASE DEFINITIONS

- *Confirmed:*

    Neuroinvasive disease

    A case that meets the above clinical criteria for neuroinvasive disease and one or more the following laboratory criteria for a confirmed case:

    - Isolation of virus from, or demonstration of specific viral antigen or nucleic acid in, tissue, blood, CSF, or other body fluid, ***OR***
    - Four-fold or greater change in virus-specific quantitative antibody titers in paired sera, ***OR***
    - Virus-specific IgM antibodies in serum with confirmatory virus-specific neutralizing antibodies in the same or a later specimen, ***OR***
    - Virus-specific IgM antibodies in CSF and a negative result for other IgM antibodies in CSF for arboviruses endemic to the region where exposure occurred.

Non-neuroinvasive disease

A case that meets the above clinical criteria for non-neuroinvasive disease and one or more of the following laboratory criteria for a confirmed case:

- Isolation of virus from, or demonstration of specific viral antigen or nucleic acid in, tissue, blood, CSF, or other body fluid, ***OR***
- Four-fold or greater change in virus-specific quantitative antibody titers in paired sera, ***OR***
- Virus-specific IgM antibodies in serum with confirmatory virus-specific neutralizing antibodies in the same or a later specimen, ***OR***
- Virus-specific IgM antibodies in CSF and a negative result for other IgM antibodies in CSF for arboviruses endemic to the region where exposure occurred.

- *Probable:*

Neuroinvasive disease

A case that meets the above clinical criteria for neuroinvasive disease and the following laboratory criteria:

- Virus-specific IgM antibodies in CSF or serum but with no other testing.

Non-neuroinvasive disease

A case that meets the above clinical criteria for non-neuroinvasive disease and the laboratory criteria for a probable case:

- Virus-specific IgM antibodies in CSF or serum but with no other testing.

Appendix B: Sedgwick County Health Department, 'Fight the Bite' Palm Card

Fight the BITE!

Mosquitoes are annoying.

They can also cause serious health problems. These tiny insects spread diseases like West Nile Virus to humans and heartworms to our pets.

The best way to avoid bites from these little suckers is to follow the three Ds:

DRAIN

Eliminate standing water; mosquitoes need water to breed. Check pots, gutters, tires, tarps, wagons, wheelbarrows – anything that holds water. Change any standing water in wading pools, pet dishes and bird baths several times a week. And, use mosquito dunks or mosquito-eating fish in ponds and stagnant water.

DEET

Use insect repellents that contain DEET. DEET offers the best protection against mosquito bites. Follow product label directions. Avoid over-application.

DRESS

Wear long, loose-fitting clothing when outdoors, especially at dawn and dusk hours, which is when mosquitoes are most active.

West Nile Virus Facts

Spread

- West Nile virus infection is spread to humans and mammals such as horses by the bite of an infected mosquito.
- Mosquitoes are infected when they feed on the blood of infected birds.
- WNV cannot be spread person-to-person or mammal-to-person.

Symptoms

- About 1 in 130 people infected with WNV develop severe illness that may require hospitalization, and about 30 will have a more mild illness.
- Mild symptoms can include fever, headache, body aches, nausea, vomiting, swollen lymph glands and skin rash.
- More severe symptoms include neck stiffness, disorientation, tremors, convulsions, muscle weakness, vision loss, numbness, paralysis and even coma or death.
- If you develop severe symptoms, seek medical attention immediately.
- Pregnant women and nursing mothers are encouraged to talk to their doctors if they develop symptoms.

For more information about West Nile Virus and mosquito bite prevention, contact the

Sedgwick County Health Department

at 316-660-7300

or visit www.sedgwickcounty.org.

Sedgwick County... working for you

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ACKNOWLEDGMENTS:

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Our Mission

To protect and improve the health and environment of all Kansans

SECTION III: APPENDICES

APPENDIX A. REPORTABLE INFECTIOUS DISEASE INCIDENCE, KANSAS AND UNITED STATES, 2013

Disease	Kansas Case Count by Classification			Kansas Rate^	U.S. Rate^*
	Confirmed	Probable	Total		
Amebiasis (Entamoeba histolytica)	4	0	4	0.14	*N/A*
Arboviral Disease					
West Nile virus neuroinvasive disease	0	33	33	1.14	0.4
West Nile virus non-neuroinvasive disease	5	54	59	2.04	0.38
Botulism	1	0	1	0.03	0.05
Campylobacteriosis	327	1	328	11.33	*N/A*
Carbapenem-resistant Enterobacteriaceae	1	0	1	0.03	*N/A*
Clostridium perfringens food intoxication	0	15	15	0.52	*N/A*
Coccidioidomycosis	3	0	3	0.10	7.81
Cryptosporidiosis	61	39	100	3.46	2.89
Cyclosporiasis	4	0	4	0.14	0.28
Ehrlichiosis/Anaplasmosis					
Anaplasma phagocytophilum (f. HGE)	0	7	7	0.24	0.93
Ehrlichiosis, *Ehrlichia chaffeensis* (f. HME)	32	54	86	2.97	0.51
Ehrlichiosis, *Ehrlichia ewingii*	2	1	3	0.10	0.01
Giardiasis	103	1	104	3.59	5.8
HUS - Hemolytic Uremic Syndrome postdiarrheal	4	0	4	0.14	0.11
Haemophilus influenzae, invasive	40	0	40	1.38	1.21
Harmful Algal Bloom Illness – Animal	0	1	1	0.03	*N/A*
Hepatitis A	11	0	11	0.38	0.57
Hepatitis B virus infection, chronic	104	0	104	3.59	*N/A*
Hepatitis B virus infection, perinatal	1	0	1	0.03	0.02
Hepatitis B, acute	10	0	10	0.35	0.97
Hepatitis C virus, past or present	1,528	0	1,528	52.80	*N/A*
Hepatitis C, acute	17	0	17	0.59	0.71
Influenza-associated pediatric mortality	1	0	1	0.03	0.22
Legionellosis	18	0	18	0.62	1.58
Listeriosis	3	0	3	0.10	0.23
Lyme Disease (*Borrelia burgdorferi*)	18	16	34	1.17	11.62
Malaria (Plasmodium spp.)	8	0	8	0.28	0.51
Meningitis, Bacterial Other	4	0	4	0.14	*N/A*
Meningococcal disease (*Neisseria meningitidis*)	3	0	3	0.10	0.18
Pertussis	279	126	405	13.99	9.12
Q Fever					
Q Fever, Acute	0	3	3	0.10	0.04
Q Fever, Chronic	0	1	1	0.03	0.01
Rabies, animal	60	0	60	*N/A*	*N/A*
Salmonellosis	423	1	424	14.65	16.13
Shiga toxin-producing Escherichia coli (STEC)	89	0	89	3.08	2.13
Shigellosis	40	0	40	1.38	4.06
Spotted Fever Rickettsiosis (RMSF)	2	166	168	5.81	1.08
Streptococcal disease, invasive, Group A	37	0	37	1.28	*N/A*
Streptococcal disease, invasive, Group B	1	0	1	0.03	*N/A*
Streptococcus pneumoniae, invasive disease	149	0	149	5.15	*N/A*
Transmissible Spongioform Enceph (TSE / CJD)	2	0	2	0.07	*N/A*
Tularemia (*Francisella tularensis*)	7	21	28	0.97	0.06
Typhoid Fever (*Salmonella typhi*)	2	0	2	0.07	0.11
Vancomycin-intermediate Staphylococcus aureus (VISA)	1	0	1	0.03	0.1
Varicella (Chickenpox)	217	239	456	15.76	4.62
Yersiniosis	2	0	2	0.07	*N/A*

^ Rate per 100,000 population

*** Centers for Disease Control and Prevention. Summary of Notifiable Diseases – United States, 2013. Morbidity and Mortality Weekly Report (MMWR) available at http://www.cdc.gov/mmwr/.**

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Amebiasis (Entamoeba histolytica)		Arboviral Disease		Botulism	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Allen	13,124	0		0		0	
Anderson	7,897	0		0		0	
Atchison	16,749	0		1	6	0	
Barber	4,947	0		0		0	
Barton	27,509	0		9	32.7	0	
Bourbon	14,852	0		0		0	
Brown	9,997	0		0		0	
Butler	65,803	0		2	3	0	
Chase	2,700	0		0		0	
Chautauqua	3,552	0		1	28.2	0	
Cherokee	20,978	0		0		0	
Cheyenne	2,694	0		0		0	
Clark	2,193	0		1	45.6	0	
Clay	8,406	0		0		0	
Cloud	9,292	0		1	1.8	0	
Coffey	8,412	0		0		0	
Comanche	1,955	0		0		0	
Cowley	36,204	0		0		0	
Crawford	39,278	0		0		0	
Decatur	2,930	0		1	34.1	0	
Dickinson	19,609	0		3	15.3	0	
Doniphan	7,851	0		0		0	
Douglas	114,322	0		0		0	
Edwards	2,945	0		0		0	
Elk	2,655	0		0		0	
Ellis	29,061	1	3.4	1	3.4	0	
Ellsworth	6,398	0		1	15.6	0	
Finney	37,098	0		0		0	
Ford	34,819	0		3	8.6	0	
Franklin	25,740	0		0		0	
Geary	37,384	0		1	2.7	0	
Gove	2,769	0		0		0	
Graham	2,593	0		0		0	
Grant	7,950	0		0		0	
Gray	6,009	0		2	33.3	0	
Greeley	1,290	0		0		0	
Greenwood	6,424	0		0		0	
Hamilton	2,609	0		1	38.3	0	
Harper	5,860	0		0		0	
Harvey	34,741	0		1	2.9	0	
Haskell	4,141	0		0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Amebiasis (Entamoeba histolytica)		Arboviral Disease		Botulism	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Hodgeman	1,950	0		0		0	
Jackson	13,366	0		0		0	
Jefferson	18,813	0		0		0	
Jewell	3,046	0		0		0	
Johnson	566,933	1	0.2	6	1.1	0	
Kearny	3,923	0		1	25.5	0	
Kingman	7,844	0		0		0	
Kiowa	2,523	0		0		0	
Labette	20,916	0		0		0	
Lane	1,720	0		1	58.1	0	
Leavenworth	78,185	0		1	1.3	0	
Lincoln	3,147	0		0		0	
Linn	9,516	0		0		0	
Logan	2,798	0		1	35.7	0	
Lyon	33,510	0		0		0	
Marion	12,219	0		1	8.2	0	
Marshall	10,002	0		2	2	0	
McPherson	29,569	0		2	6.8	0	
Meade	4,343	0		0		0	
Miami	32,835	0		0		0	
Mitchell	6,378	0		0		0	
Montgomery	34,292	0		0		0	
Morris	5,741	0		1	17.4	0	
Morton	3,143	0		0		0	
Nemaha	10,161	0		0		0	
Neosho	16,430	0		0		0	
Ness	3,073	0		1	32.5	0	
Norton	5,622	0		1	17.8	0	
Osage	16,142	0		0		0	
Osborne	3,818	0		0		0	
Ottawa	6,042	0		1	16.6	0	
Pawnee	6,971	0		0		0	
Phillips	5,540	0		2	36.1	0	
Pottawatomie	22,691	0		0		0	
Pratt	9,878	0		1	1.1	0	
Rawlins	2,589	0		0		0	
Reno	64,190	0		8	12.5	0	
Republic	4,820	0		3	62.2	0	
Rice	10,011	0		2	2	0	
Riley	75,394	0		1	1.3	0	
Rooks	5,190	0		0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Amebiasis (Entamoeba histolytica)		Arboviral Disease		Botulism	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Rush	3,186	0		2	62.8	0	
Russell	6,933	0		1	14.4	0	
Saline	55,740	0		1	1.8	0	
Scott	5,035	0		1	19.9	0	
Sedgwick	505,415	2	0.4	11	2.2	0	
Seward	23,390	0		0		0	
Shawnee	178,831	0		0		1	0.6
Sheridan	2,553	0		0		0	
Sherman	6,115	0		3	49.1	0	
Smith	3,706	0		0		0	
Stafford	4,359	0		3	68.8	0	
Stanton	2,194	0		0		0	
Stevens	5,816	0		0		0	
Sumner	23,591	0		0		0	
Thomas	7,948	0		2	25.2	0	
Trego	2,980	0		0		0	
Wabaunsee	7,051	0		0		0	
Wallace	1,569	0		0		0	
Washington	5,629	0		0		0	
Wichita	2,192	0		0		0	
Wilson	9,105	0		0		0	
Woodson	3,221	0		0		0	
Wyandotte	160,384	0		3	1.9	0	
Unknown		0		0		0	
Total	2,893,957	4	0.0	92	0.0	1	0.0

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Campylobacteriosis		Carbapenem-resistant Enterobacteriaceae		Clostridium perfringens food intoxication	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Allen	13,124	0		0		0	
Anderson	7,897	0		0		0	
Atchison	16,749	0		0		0	
Barber	4,947	6	121.3	0		0	
Barton	27,509	7	25.4	0		0	
Bourbon	14,852	1	6.7	0		0	
Brown	9,997	2	2	0		0	
Butler	65,803	8	12.2	0		0	
Chase	2,700	0		0		0	
Chautauqua	3,552	0		0		0	
Cherokee	20,978	1	4.8	0		0	
Cheyenne	2,694	1	37.1	0		0	
Clark	2,193	0		0		0	
Clay	8,406	1	11.9	0		0	
Cloud	9,292	1	1.8	0		0	
Coffey	8,412	1	11.9	0		0	
Comanche	1,955	0		0		0	
Cowley	36,204	4	11	0		0	
Crawford	39,278	10	25.5	1	2.5	0	
Decatur	2,930	2	68.3	0		0	
Dickinson	19,609	2	1.2	0		0	
Doniphan	7,851	2	25.5	0		0	
Douglas	114,322	14	12.2	0		2	1.7
Edwards	2,945	0		0		0	
Elk	2,655	0		0		0	
Ellis	29,061	4	13.8	0		0	
Ellsworth	6,398	0		0		0	
Finney	37,098	22	59.3	0		0	
Ford	34,819	8	23	0		0	
Franklin	25,740	2	7.8	0		0	
Geary	37,384	4	1.7	0		0	
Gove	2,769	5	18.6	0		0	
Graham	2,593	3	115.7	0		0	
Grant	7,950	0		0		0	
Gray	6,009	0		0		0	
Greeley	1,290	0		0		0	
Greenwood	6,424	0		0		0	
Hamilton	2,609	3	115	0		0	
Harper	5,860	2	34.1	0		0	
Harvey	34,741	6	17.3	0		0	
Haskell	4,141	0		0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Campylobacteriosis		Carbapenem-resistant Enterobacteriaceae		Clostridium perfringens food intoxication	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Hodgeman	1,950	0		0		0	
Jackson	13,366	2	15	0		0	
Jefferson	18,813	3	15.9	0		0	
Jewell	3,046	4	131.3	0		0	
Johnson	566,933	44	7.8	0		5	0.9
Kearny	3,923	3	76.5	0		0	
Kingman	7,844	1	12.7	0		0	
Kiowa	2,523	0		0		0	
Labette	20,916	0		0		0	
Lane	1,720	0		0		0	
Leavenworth	78,185	2	2.6	0		0	
Lincoln	3,147	1	31.8	0		0	
Linn	9,516	0		0		0	
Logan	2,798	2	71.5	0		0	
Lyon	33,510	5	14.9	0		0	
Marion	12,219	4	32.7	0		0	
Marshall	10,002	1	1	0		0	
McPherson	29,569	4	13.5	0		0	
Meade	4,343	1	23	0		0	
Miami	32,835	2	6.1	0		0	
Mitchell	6,378	1	15.7	0		0	
Montgomery	34,292	2	5.8	0		0	
Morris	5,741	1	17.4	0		0	
Morton	3,143	0		0		0	
Nemaha	10,161	0		0		0	
Neosho	16,430	4	24.3	0		0	
Ness	3,073	0		0		0	
Norton	5,622	0		0		0	
Osage	16,142	0		0		0	
Osborne	3,818	2	52.4	0		0	
Ottawa	6,042	1	16.6	0		0	
Pawnee	6,971	0		0		0	
Phillips	5,540	4	72.2	0		0	
Pottawatomie	22,691	2	8.8	0		4	17.6
Pratt	9,878	3	3.4	0		0	
Rawlins	2,589	0		0		0	
Reno	64,190	7	1.9	0		0	
Republic	4,820	0		0		0	
Rice	10,011	3	3	0		0	
Riley	75,394	10	13.3	0		3	4
Rooks	5,190	3	57.8	0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Campylobacteriosis		Carbapenem-resistant Enterobacteriaceae		Clostridium perfringens food intoxication	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Rush	3,186	1	31.4	0		0	
Russell	6,933	4	57.7	0		0	
Saline	55,740	7	12.6	0		0	
Scott	5,035	4	79.4	0		0	
Sedgwick	505,415	39	7.7	0		0	
Seward	23,390	0		0		0	
Shawnee	178,831	5	2.8	0		0	
Sheridan	2,553	0		0		0	
Sherman	6,115	0		0		0	
Smith	3,706	0		0		0	
Stafford	4,359	2	45.9	0		0	
Stanton	2,194	1	45.6	0		0	
Stevens	5,816	0		0		0	
Sumner	23,591	4	17	0		0	
Thomas	7,948	0		0		0	
Trego	2,980	0		0		0	
Wabaunsee	7,051	0		0		0	
Wallace	1,569	0		0		0	
Washington	5,629	4	71.1	0		0	
Wichita	2,192	0		0		0	
Wilson	9,105	0		0		0	
Woodson	3,221	0		0		0	
Wyandotte	160,384	13	8.1	0		1	0.6
Unknown		0		0		0	
Total	2,893,957	328	0.0	1	0.0	15	0.0

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Coccidioidomycosis		Cryptosporidiosis		Cyclosporiasis	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Allen	13,124	0		1	7.6	0	
Anderson	7,897	0		0		0	
Atchison	16,749	0		0		0	
Barber	4,947	0		0		0	
Barton	27,509	0		2	7.3	0	
Bourbon	14,852	0		0		0	
Brown	9,997	0		1	1	0	
Butler	65,803	0		0		0	
Chase	2,700	0		0		0	
Chautauqua	3,552	0		0		0	
Cherokee	20,978	0		2	9.5	0	
Cheyenne	2,694	0		1	37.1	0	
Clark	2,193	0		0		0	
Clay	8,406	0		0		0	
Cloud	9,292	0		0		0	
Coffey	8,412	0		0		0	
Comanche	1,955	0		0		0	
Cowley	36,204	0		1	2.8	0	
Crawford	39,278	0		1	2.5	0	
Decatur	2,930	0		0		0	
Dickinson	19,609	0		0		0	
Doniphan	7,851	0		0		0	
Douglas	114,322	0		4	3.5	0	
Edwards	2,945	0		0		0	
Elk	2,655	0		0		0	
Ellis	29,061	0		0		0	
Ellsworth	6,398	0		2	31.3	0	
Finney	37,098	0		1	2.7	0	
Ford	34,819	0		0		0	
Franklin	25,740	0		2	7.8	0	
Geary	37,384	0		0		0	
Gove	2,769	0		0		0	
Graham	2,593	0		1	38.6	0	
Grant	7,950	0		0		0	
Gray	6,009	0		0		0	
Greeley	1,290	0		0		0	
Greenwood	6,424	0		0		0	
Hamilton	2,609	0		0		0	
Harper	5,860	0		0		1	17.1
Harvey	34,741	0		1	2.9	0	
Haskell	4,141	0		0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Coccidioidomycosis		Cryptosporidiosis		Cyclosporiasis	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Hodgeman	1,950	0		0		0	
Jackson	13,366	0		1	7.5	0	
Jefferson	18,813	0		1	5.3	0	
Jewell	3,046	0		0		0	
Johnson	566,933	2	0.4	20	3.5	1	0.2
Kearny	3,923	0		0		0	
Kingman	7,844	0		0		0	
Kiowa	2,523	0		0		0	
Labette	20,916	0		0		0	
Lane	1,720	0		0		0	
Leavenworth	78,185	0		1	1.3	0	
Lincoln	3,147	0		0		0	
Linn	9,516	0		0		0	
Logan	2,798	0		0		0	
Lyon	33,510	0		0		0	
Marion	12,219	0		0		0	
Marshall	10,002	0		2	2	0	
McPherson	29,569	0		1	3.4	0	
Meade	4,343	0		0		0	
Miami	32,835	0		3	9.1	0	
Mitchell	6,378	0		0		0	
Montgomery	34,292	0		0		0	
Morris	5,741	0		0		0	
Morton	3,143	0		0		0	
Nemaha	10,161	0		3	29.5	0	
Neosho	16,430	0		0		0	
Ness	3,073	0		0		0	
Norton	5,622	0		0		0	
Osage	16,142	0		0		0	
Osborne	3,818	0		1	26.2	0	
Ottawa	6,042	0		0		0	
Pawnee	6,971	0		1	14.3	0	
Phillips	5,540	0		0		1	18.1
Pottawatomie	22,691	0		2	8.8	0	
Pratt	9,878	0		0		0	
Rawlins	2,589	0		0		0	
Reno	64,190	0		9	14	0	
Republic	4,820	0		0		0	
Rice	10,011	0		1	1	0	
Riley	75,394	0		5	6.6	0	
Rooks	5,190	0		0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Coccidioidomycosis		Cryptosporidiosis		Cyclosporiasis	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Rush	3,186	0		0		0	
Russell	6,933	0		0		0	
Saline	55,740	0		1	1.8	0	
Scott	5,035	0		0		0	
Sedgwick	505,415	0		6	1.2	1	0.2
Seward	23,390	0		0		0	
Shawnee	178,831	1	0.6	5	2.8	0	
Sheridan	2,553	0		0		0	
Sherman	6,115	0		0		0	
Smith	3,706	0		1	27	0	
Stafford	4,359	0		0		0	
Stanton	2,194	0		0		0	
Stevens	5,816	0		0		0	
Sumner	23,591	0		0		0	
Thomas	7,948	0		7	88.1	0	
Trego	2,980	0		0		0	
Wabaunsee	7,051	0		1	14.2	0	
Wallace	1,569	0		0		0	
Washington	5,629	0		0		0	
Wichita	2,192	0		0		0	
Wilson	9,105	0		1	11	0	
Woodson	3,221	0		0		0	
Wyandotte	160,384	0		7	4.4	0	
Unknown		0		0		0	
Total	2,893,957	3	0.0	100	0.0	4	0.0

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Ehrlichiosis / Anaplasmosis		Giardiasis		HUS - Hemolytic Uremic Syndrome postdiarrheal	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Allen	13,124	0		0		0	
Anderson	7,897	1	12.7	0		0	
Atchison	16,749	1	6	1	6	0	
Barber	4,947	0		0		0	
Barton	27,509	0		1	3.6	0	
Bourbon	14,852	2	13.5	0		0	
Brown	9,997	0		0		0	
Butler	65,803	2	3	4	6.1	0	
Chase	2,700	0		0		0	
Chautauqua	3,552	1	28.2	0		0	
Cherokee	20,978	6	28.6	0		0	
Cheyenne	2,694	0		0		0	
Clark	2,193	0		0		0	
Clay	8,406	0		1	11.9	0	
Cloud	9,292	0		1	1.8	0	
Coffey	8,412	1	11.9	0		0	
Comanche	1,955	0		0		0	
Cowley	36,204	1	2.8	1	2.8	0	
Crawford	39,278	6	15.3	0		0	
Decatur	2,930	0		0		0	
Dickinson	19,609	0		0		0	
Doniphan	7,851	0		0		0	
Douglas	114,322	11	9.6	5	4.4	0	
Edwards	2,945	0		0		0	
Elk	2,655	1	37.7	0		0	
Ellis	29,061	0		1	3.4	0	
Ellsworth	6,398	0		1	15.6	0	
Finney	37,098	0		0		0	
Ford	34,819	0		3	8.6	0	
Franklin	25,740	1	3.9	0		0	
Geary	37,384	0		1	2.7	0	
Gove	2,769	0		0		0	
Graham	2,593	0		0		0	
Grant	7,950	0		0		0	
Gray	6,009	0		1	16.6	0	
Greeley	1,290	0		1	77.5	0	
Greenwood	6,424	0		0		0	
Hamilton	2,609	0		0		0	
Harper	5,860	0		0		0	
Harvey	34,741	0		2	5.8	0	
Haskell	4,141	0		0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Ehrlichiosis / Anaplasmosis		Giardiasis		HUS - Hemolytic Uremic Syndrome postdiarrheal	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Hodgeman	1,950	0		0		0	
Jackson	13,366	2	15	1	7.5	0	
Jefferson	18,813	4	21.3	0		0	
Jewell	3,046	0		0		0	
Johnson	566,933	23	4.1	32	5.6	2	0.4
Kearny	3,923	0		0		0	
Kingman	7,844	1	12.7	0		0	
Kiowa	2,523	0		0		0	
Labette	20,916	5	23.9	0		0	
Lane	1,720	0		0		0	
Leavenworth	78,185	1	1.3	0		0	
Lincoln	3,147	0		1	31.8	0	
Linn	9,516	1	1.5	1	1.5	0	
Logan	2,798	0		0		0	
Lyon	33,510	2	6	0		0	
Marion	12,219	0		0		0	
Marshall	10,002	1	1	0		0	
McPherson	29,569	1	3.4	2	6.8	0	
Meade	4,343	0		0		0	
Miami	32,835	0		0		0	
Mitchell	6,378	0		0		0	
Montgomery	34,292	2	5.8	0		0	
Morris	5,741	2	34.8	0		0	
Morton	3,143	0		0		0	
Nemaha	10,161	2	19.7	2	19.7	0	
Neosho	16,430	0		0		0	
Ness	3,073	0		0		0	
Norton	5,622	0		0		0	
Osage	16,142	1	6.2	0		0	
Osborne	3,818	0		0		0	
Ottawa	6,042	0		0		0	
Pawnee	6,971	0		0		0	
Phillips	5,540	0		0		0	
Pottawatomie	22,691	0		0		0	
Pratt	9,878	0		0		0	
Rawlins	2,589	0		0		0	
Reno	64,190	2	3.1	2	3.1	0	
Republic	4,820	0		0		0	
Rice	10,011	0		0		0	
Riley	75,394	0		0		0	
Rooks	5,190	0		0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Ehrlichiosis / Anaplasmosis		Giardiasis		HUS - Hemolytic Uremic Syndrome postdiarrheal	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Rush	3,186	0		0		0	
Russell	6,933	0		1	14.4	0	
Saline	55,740	0		7	12.6	0	
Scott	5,035	0		0		0	
Sedgwick	505,415	3	0.6	21	4.2	2	0.4
Seward	23,390	0		1	4.3	0	
Shawnee	178,831	3	1.7	3	1.7	0	
Sheridan	2,553	0		0		0	
Sherman	6,115	0		1	16.4	0	
Smith	3,706	0		0		0	
Stafford	4,359	0		0		0	
Stanton	2,194	0		0		0	
Stevens	5,816	0		0		0	
Sumner	23,591	0		2	8.5	0	
Thomas	7,948	0		0		0	
Trego	2,980	0		0		0	
Wabaunsee	7,051	0		1	14.2	0	
Wallace	1,569	0		0		0	
Washington	5,629	0		0		0	
Wichita	2,192	0		0		0	
Wilson	9,105	0		0		0	
Woodson	3,221	1	31	0		0	
Wyandotte	160,384	5	3.1	2	1.2	0	
Unknown		0		0		0	
Total	2,893,957	96	0.0	104	0.0	4	0.0

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Haemophilus influenzae, invasive disease (Including Hib)		Harmful Algal Bloom Illness - Animal		Hepatitis A	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Allen	13,124	0		0		0	
Anderson	7,897	0		0		0	
Atchison	16,749	2	11.9	0		0	
Barber	4,947	0		0		0	
Barton	27,509	1	3.6	0		0	
Bourbon	14,852	0		0		0	
Brown	9,997	0		0		0	
Butler	65,803	1	1.5	0		0	
Chase	2,700	0		0		0	
Chautauqua	3,552	0		0		0	
Cherokee	20,978	0		0		0	
Cheyenne	2,694	0		0		0	
Clark	2,193	0		0		0	
Clay	8,406	0		0		0	
Cloud	9,292	0		0		0	
Coffey	8,412	0		0		0	
Comanche	1,955	0		0		0	
Cowley	36,204	1	2.8	0		0	
Crawford	39,278	0		0		0	
Decatur	2,930	0		0		0	
Dickinson	19,609	0		0		0	
Doniphan	7,851	0		0		0	
Douglas	114,322	0		0		0	
Edwards	2,945	0		0		0	
Elk	2,655	0		0		0	
Ellis	29,061	0		0		0	
Ellsworth	6,398	0		0		0	
Finney	37,098	0		0		0	
Ford	34,819	0		0		0	
Franklin	25,740	1	3.9	0		0	
Geary	37,384	0		0		0	
Gove	2,769	0		0		0	
Graham	2,593	0		0		0	
Grant	7,950	0		0		0	
Gray	6,009	0		0		0	
Greeley	1,290	0		0		0	
Greenwood	6,424	0		0		0	
Hamilton	2,609	0		0		0	
Harper	5,860	0		0		0	
Harvey	34,741	0		0		0	
Haskell	4,141	0		0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Haemophilus influenzae, invasive disease (Including Hib)		Harmful Algal Bloom Illness - Animal		Hepatitis A	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Hodgeman	1,950	0		0		0	
Jackson	13,366	1	7.5	0		1	7.5
Jefferson	18,813	0		0		0	
Jewell	3,046	0		0		0	
Johnson	566,933	6	1.1	0		6	1.1
Kearny	3,923	0		0		0	
Kingman	7,844	1	12.7	0		0	
Kiowa	2,523	0		0		0	
Labette	20,916	0		0		0	
Lane	1,720	0		0		0	
Leavenworth	78,185	1	1.3	0		0	
Lincoln	3,147	0		0		0	
Linn	9,516	0		0		0	
Logan	2,798	0		0		0	
Lyon	33,510	0		0		0	
Marion	12,219	0		0		0	
Marshall	10,002	2	2	1	1	0	
McPherson	29,569	0		0		0	
Meade	4,343	0		0		0	
Miami	32,835	0		0		0	
Mitchell	6,378	0		0		0	
Montgomery	34,292	1	2.9	0		0	
Morris	5,741	0		0		0	
Morton	3,143	0		0		0	
Nemaha	10,161	0		0		0	
Neosho	16,430	0		0		0	
Ness	3,073	0		0		0	
Norton	5,622	0		0		0	
Osage	16,142	0		0		0	
Osborne	3,818	0		0		0	
Ottawa	6,042	0		0		0	
Pawnee	6,971	0		0		0	
Phillips	5,540	0		0		0	
Pottawatomie	22,691	1	4.4	0		0	
Pratt	9,878	0		0		0	
Rawlins	2,589	0		0		0	
Reno	64,190	1	1.6	0		0	
Republic	4,820	0		0		0	
Rice	10,011	0		0		0	
Riley	75,394	1	1.3	0		0	
Rooks	5,190	3	57.8	0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Haemophilus influenzae, invasive disease (Including Hib)		Harmful Algal Bloom Illness - Animal		Hepatitis A	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Rush	3,186	0		0		0	
Russell	6,933	0		0		0	
Saline	55,740	0		0		0	
Scott	5,035	0		0		0	
Sedgwick	505,415	7	1.4	0		1	0.2
Seward	23,390	0		0		0	
Shawnee	178,831	0		0		2	1.1
Sheridan	2,553	0		0		0	
Sherman	6,115	1	16.4	0		0	
Smith	3,706	0		0		0	
Stafford	4,359	0		0		0	
Stanton	2,194	1	45.6	0		0	
Stevens	5,816	0		0		0	
Sumner	23,591	0		0		0	
Thomas	7,948	0		0		0	
Trego	2,980	0		0		0	
Wabaunsee	7,051	0		0		0	
Wallace	1,569	0		0		0	
Washington	5,629	0		0		0	
Wichita	2,192	0		0		0	
Wilson	9,105	0		0		0	
Woodson	3,221	0		0		0	
Wyandotte	160,384	7	4.4	0		1	0.6
Unknown		0		0		0	
Total	2,893,957	40	0.0	1	0.0	11	0.0

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Hepatitis B virus infection, chronic		Hepatitis B virus infection, perinatal		Hepatitis B, acute	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Allen	13,124	0		0		0	
Anderson	7,897	0		0		0	
Atchison	16,749	0		0		0	
Barber	4,947	0		0		0	
Barton	27,509	1	3.6	0		1	3.6
Bourbon	14,852	0		0		0	
Brown	9,997	0		0		0	
Butler	65,803	2	3	0		1	1.5
Chase	2,700	1	37	0		0	
Chautauqua	3,552	0		0		0	
Cherokee	20,978	0		0		0	
Cheyenne	2,694	0		0		0	
Clark	2,193	0		0		0	
Clay	8,406	0		0		0	
Cloud	9,292	0		0		0	
Coffey	8,412	0		0		0	
Comanche	1,955	0		0		0	
Cowley	36,204	0		0		1	2.8
Crawford	39,278	2	5.1	0		0	
Decatur	2,930	0		0		0	
Dickinson	19,609	1	5.1	0		0	
Doniphan	7,851	0		0		0	
Douglas	114,322	3	2.6	1	0.9	0	
Edwards	2,945	1	34	0		0	
Elk	2,655	0		0		0	
Ellis	29,061	0		0		0	
Ellsworth	6,398	0		0		0	
Finney	37,098	0		0		0	
Ford	34,819	2	5.7	0		0	
Franklin	25,740	0		0		0	
Geary	37,384	4	1.7	0		1	2.7
Gove	2,769	0		0		0	
Graham	2,593	0		0		0	
Grant	7,950	1	12.6	0		0	
Gray	6,009	0		0		0	
Greeley	1,290	0		0		0	
Greenwood	6,424	0		0		0	
Hamilton	2,609	0		0		0	
Harper	5,860	0		0		0	
Harvey	34,741	1	2.9	0		0	
Haskell	4,141	0		0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Hepatitis B virus infection, chronic		Hepatitis B virus infection, perinatal		Hepatitis B, acute	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Hodgeman	1,950	0		0		0	
Jackson	13,366	0		0		0	
Jefferson	18,813	0		0		0	
Jewell	3,046	0		0		0	
Johnson	566,933	14	2.5	0		2	0.4
Kearny	3,923	0		0		0	
Kingman	7,844	0		0		0	
Kiowa	2,523	0		0		0	
Labette	20,916	0		0		0	
Lane	1,720	1	58.1	0		0	
Leavenworth	78,185	0		0		0	
Lincoln	3,147	0		0		0	
Linn	9,516	0		0		0	
Logan	2,798	0		0		0	
Lyon	33,510	1	3	0		0	
Marion	12,219	0		0		0	
Marshall	10,002	0		0		0	
McPherson	29,569	1	3.4	0		0	
Meade	4,343	0		0		0	
Miami	32,835	0		0		0	
Mitchell	6,378	0		0		0	
Montgomery	34,292	1	2.9	0		0	
Morris	5,741	0		0		0	
Morton	3,143	0		0		0	
Nemaha	10,161	0		0		0	
Neosho	16,430	0		0		0	
Ness	3,073	0		0		0	
Norton	5,622	0		0		0	
Osage	16,142	0		0		0	
Osborne	3,818	0		0		0	
Ottawa	6,042	0		0		0	
Pawnee	6,971	0		0		0	
Phillips	5,540	0		0		0	
Pottawatomie	22,691	0		0		0	
Pratt	9,878	0		0		0	
Rawlins	2,589	0		0		0	
Reno	64,190	0		0		0	
Republic	4,820	0		0		0	
Rice	10,011	0		0		0	
Riley	75,394	4	5.3	0		0	
Rooks	5,190	0		0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Hepatitis B virus infection, chronic		Hepatitis B virus infection, perinatal		Hepatitis B, acute	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Rush	3,186	0		0		0	
Russell	6,933	0		0		0	
Saline	55,740	4	7.2	0		0	
Scott	5,035	0		0		0	
Sedgwick	505,415	42	8.3	0		3	0.6
Seward	23,390	1	4.3	0		0	
Shawnee	178,831	5	2.8	0		0	
Sheridan	2,553	0		0		0	
Sherman	6,115	0		0		0	
Smith	3,706	0		0		0	
Stafford	4,359	0		0		0	
Stanton	2,194	0		0		0	
Stevens	5,816	0		0		0	
Sumner	23,591	0		0		0	
Thomas	7,948	0		0		0	
Trego	2,980	0		0		0	
Wabaunsee	7,051	0		0		0	
Wallace	1,569	0		0		0	
Washington	5,629	0		0		0	
Wichita	2,192	0		0		0	
Wilson	9,105	0		0		0	
Woodson	3,221	0		0		0	
Wyandotte	160,384	11	6.9	0		1	0.6
Unknown		0		0		0	
Total	2,893,957	104	0.0	1	0.0	10	0.0

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Hepatitis C virus, past or present		Hepatitis C, acute		Influenza-associated pediatric mortality	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Allen	13,124	3	22.9	0		0	
Anderson	7,897	3	38	0		0	
Atchison	16,749	26	155.2	0		0	
Barber	4,947	1	2.2	0		0	
Barton	27,509	11	4	0		0	
Bourbon	14,852	4	26.9	0		0	
Brown	9,997	7	7	0		0	
Butler	65,803	22	33.4	0		0	
Chase	2,700	0		0		0	
Chautauqua	3,552	1	28.2	0		0	
Cherokee	20,978	25	119.2	0		0	
Cheyenne	2,694	0		0		0	
Clark	2,193	1	45.6	0		0	
Clay	8,406	7	83.3	1	11.9	0	
Cloud	9,292	3	32.3	0		0	
Coffey	8,412	1	11.9	0		0	
Comanche	1,955	0		0		0	
Cowley	36,204	30	82.9	0		0	
Crawford	39,278	52	132.4	0		0	
Decatur	2,930	0		0		0	
Dickinson	19,609	11	56.1	0		0	
Doniphan	7,851	1	12.7	0		0	
Douglas	114,322	58	5.7	1	0.9	0	
Edwards	2,945	0		0		0	
Elk	2,655	0		0		0	
Ellis	29,061	9	31	1	3.4	0	
Ellsworth	6,398	9	14.7	0		0	
Finney	37,098	12	32.3	0		0	
Ford	34,819	8	23	1	2.9	0	
Franklin	25,740	16	62.2	0		0	
Geary	37,384	23	61.5	0		0	
Gove	2,769	1	36.1	0		0	
Graham	2,593	0		1	38.6	0	
Grant	7,950	0		0		0	
Gray	6,009	3	49.9	0		0	
Greeley	1,290	0		0		0	
Greenwood	6,424	1	15.6	0		0	
Hamilton	2,609	0		0		0	
Harper	5,860	6	12.4	0		0	
Harvey	34,741	21	6.4	0		0	
Haskell	4,141	0		0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Hepatitis C virus, past or present		Hepatitis C, acute		Influenza-associated pediatric mortality	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Hodgeman	1,950	1	51.3	0		0	
Jackson	13,366	3	22.4	1	7.5	0	
Jefferson	18,813	4	21.3	0		0	
Jewell	3,046	2	65.7	0		0	
Johnson	566,933	157	27.7	1	0.2	0	
Kearny	3,923	1	25.5	0		0	
Kingman	7,844	2	25.5	0		0	
Kiowa	2,523	0		0		0	
Labette	20,916	18	86.1	1	4.8	0	
Lane	1,720	0		0		0	
Leavenworth	78,185	106	135.6	0		0	
Lincoln	3,147	0		0		0	
Linn	9,516	8	84.1	0		0	
Logan	2,798	1	35.7	0		0	
Lyon	33,510	16	47.7	0		0	
Marion	12,219	5	4.9	1	8.2	0	
Marshall	10,002	7	7	0		0	
McPherson	29,569	10	33.8	0		0	
Meade	4,343	1	23	0		0	
Miami	32,835	20	6.9	0		0	
Mitchell	6,378	2	31.4	0		0	
Montgomery	34,292	19	55.4	0		0	
Morris	5,741	1	17.4	0		0	
Morton	3,143	1	31.8	0		0	
Nemaha	10,161	3	29.5	0		0	
Neosho	16,430	4	24.3	1	6.1	0	
Ness	3,073	1	32.5	0		0	
Norton	5,622	6	16.7	0		0	
Osage	16,142	9	55.8	0		0	
Osborne	3,818	2	52.4	0		0	
Ottawa	6,042	3	49.7	0		0	
Pawnee	6,971	10	143.5	1	14.3	0	
Phillips	5,540	2	36.1	0		0	
Pottawatomie	22,691	2	8.8	0		0	
Pratt	9,878	4	4.5	0		0	
Rawlins	2,589	0		0		0	
Reno	64,190	60	93.5	0		0	
Republic	4,820	0		0		0	
Rice	10,011	1	1	0		0	
Riley	75,394	19	25.2	0		0	
Rooks	5,190	2	38.5	0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Hepatitis C virus, past or present		Hepatitis C, acute		Influenza-associated pediatric mortality	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Rush	3,186	0		0		0	
Russell	6,933	3	43.3	0		0	
Saline	55,740	34	61	1	1.8	0	
Scott	5,035	0		0		0	
Sedgwick	505,415	291	57.6	0		1	0.2
Seward	23,390	8	34.2	0		0	
Shawnee	178,831	150	83.9	3	1.7	0	
Sheridan	2,553	1	39.2	0		0	
Sherman	6,115	2	32.7	0		0	
Smith	3,706	0		0		0	
Stafford	4,359	1	22.9	0		0	
Stanton	2,194	0		0		0	
Stevens	5,816	4	68.8	0		0	
Sumner	23,591	12	5.9	0		0	
Thomas	7,948	2	25.2	0		0	
Trego	2,980	0		0		0	
Wabaunsee	7,051	1	14.2	0		0	
Wallace	1,569	0		0		0	
Washington	5,629	0		0		0	
Wichita	2,192	0		0		0	
Wilson	9,105	5	54.9	0		0	
Woodson	3,221	2	62.1	0		0	
Wyandotte	160,384	122	76.1	1	0.6	0	
Unknown		1		1		0	
Total	2,893,957	1528	0.0	17	0.0	1	0.0

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Legionellosis		Listeriosis		Lyme Disease (Borrelia burgdorferi)	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Allen	13,124	0		0		0	
Anderson	7,897	0		0		0	
Atchison	16,749	0		0		0	
Barber	4,947	0		0		0	
Barton	27,509	0		0		0	
Bourbon	14,852	0		0		0	
Brown	9,997	0		0		0	
Butler	65,803	0		0		0	
Chase	2,700	0		0		0	
Chautauqua	3,552	0		0		0	
Cherokee	20,978	0		0		0	
Cheyenne	2,694	0		0		0	
Clark	2,193	0		0		0	
Clay	8,406	0		0		0	
Cloud	9,292	0		0		1	1.8
Coffey	8,412	0		0		1	11.9
Comanche	1,955	0		0		0	
Cowley	36,204	0		0		0	
Crawford	39,278	0		0		1	2.5
Decatur	2,930	0		0		0	
Dickinson	19,609	0		0		0	
Doniphan	7,851	0		0		0	
Douglas	114,322	0		0		6	5.2
Edwards	2,945	0		0		0	
Elk	2,655	0		0		0	
Ellis	29,061	0		0		0	
Ellsworth	6,398	0		0		0	
Finney	37,098	1	2.7	0		0	
Ford	34,819	1	2.9	0		0	
Franklin	25,740	0		0		1	3.9
Geary	37,384	0		0		0	
Gove	2,769	0		0		0	
Graham	2,593	0		0		0	
Grant	7,950	0		0		0	
Gray	6,009	0		0		0	
Greeley	1,290	0		0		0	
Greenwood	6,424	0		0		0	
Hamilton	2,609	0		0		0	
Harper	5,860	0		0		0	
Harvey	34,741	0		1	2.9	0	
Haskell	4,141	0		0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Legionellosis		Listeriosis		Lyme Disease (Borrelia burgdorferi)	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Hodgeman	1,950	0		0		0	
Jackson	13,366	0		0		0	
Jefferson	18,813	0		0		0	
Jewell	3,046	0		0		0	
Johnson	566,933	4	0.7	0		7	1.2
Kearny	3,923	0		0		0	
Kingman	7,844	0		0		0	
Kiowa	2,523	0		0		0	
Labette	20,916	0		0		2	9.6
Lane	1,720	0		0		0	
Leavenworth	78,185	1	1.3	0		0	
Lincoln	3,147	0		0		0	
Linn	9,516	0		0		0	
Logan	2,798	0		0		0	
Lyon	33,510	0		0		1	3
Marion	12,219	0		0		1	8.2
Marshall	10,002	0		0		0	
McPherson	29,569	0		0		0	
Meade	4,343	0		0		0	
Miami	32,835	0		0		0	
Mitchell	6,378	0		0		0	
Montgomery	34,292	0		0		1	2.9
Morris	5,741	0		0		1	17.4
Morton	3,143	0		0		0	
Nemaha	10,161	0		0		0	
Neosho	16,430	0		0		0	
Ness	3,073	0		0		0	
Norton	5,622	0		0		0	
Osage	16,142	0		0		0	
Osborne	3,818	0		0		0	
Ottawa	6,042	0		0		0	
Pawnee	6,971	0		0		0	
Phillips	5,540	0		0		0	
Pottawatomie	22,691	0		0		0	
Pratt	9,878	0		0		0	
Rawlins	2,589	0		0		0	
Reno	64,190	0		1	1.6	1	1.6
Republic	4,820	0		0		0	
Rice	10,011	0		0		0	
Riley	75,394	1	1.3	0		1	1.3
Rooks	5,190	0		0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Legionellosis		Listeriosis		Lyme Disease (Borrelia burgdorferi)	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Rush	3,186	0		0		0	
Russell	6,933	0		0		0	
Saline	55,740	1	1.8	0		1	1.8
Scott	5,035	0		0		0	
Sedgwick	505,415	7	1.4	0		5	1
Seward	23,390	0		0		0	
Shawnee	178,831	0		0		1	0.6
Sheridan	2,553	0		0		0	
Sherman	6,115	0		0		0	
Smith	3,706	0		0		0	
Stafford	4,359	0		0		0	
Stanton	2,194	0		0		0	
Stevens	5,816	0		0		0	
Sumner	23,591	0		0		0	
Thomas	7,948	0		0		0	
Trego	2,980	0		0		0	
Wabaunsee	7,051	0		0		0	
Wallace	1,569	0		0		0	
Washington	5,629	0		0		0	
Wichita	2,192	0		0		0	
Wilson	9,105	0		0		0	
Woodson	3,221	0		0		0	
Wyandotte	160,384	2	1.2	1	0.6	2	1.2
Unknown		0		0		0	
Total	2,893,957	18	0.0	3	0.0	34	0.0

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Malaria (Plasmodium spp.)		Meningitis, Bacterial Other		Meningococcal disease (Neisseria meningitidis)	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Allen	13,124	0		0		0	
Anderson	7,897	0		0		0	
Atchison	16,749	0		0		0	
Barber	4,947	0		0		0	
Barton	27,509	0		0		0	
Bourbon	14,852	0		0		0	
Brown	9,997	0		0		0	
Butler	65,803	0		0		0	
Chase	2,700	0		0		0	
Chautauqua	3,552	0		0		0	
Cherokee	20,978	0		0		0	
Cheyenne	2,694	0		0		0	
Clark	2,193	0		0		0	
Clay	8,406	0		0		0	
Cloud	9,292	0		0		0	
Coffey	8,412	0		0		0	
Comanche	1,955	0		0		0	
Cowley	36,204	0		0		0	
Crawford	39,278	0		0		0	
Decatur	2,930	0		0		0	
Dickinson	19,609	0		0		0	
Doniphan	7,851	0		0		0	
Douglas	114,322	0		0		1	0.9
Edwards	2,945	0		0		0	
Elk	2,655	0		0		0	
Ellis	29,061	0		0		0	
Ellsworth	6,398	0		0		0	
Finney	37,098	0		0		0	
Ford	34,819	0		0		0	
Franklin	25,740	0		0		0	
Geary	37,384	0		0		0	
Gove	2,769	0		0		0	
Graham	2,593	0		0		0	
Grant	7,950	0		0		0	
Gray	6,009	0		0		0	
Greeley	1,290	0		0		0	
Greenwood	6,424	0		0		0	
Hamilton	2,609	0		0		0	
Harper	5,860	0		0		0	
Harvey	34,741	0		0		1	2.9
Haskell	4,141	0		0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Malaria (Plasmodium spp.)		Meningitis, Bacterial Other		Meningococcal disease (Neisseria meningitidis)	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Hodgeman	1,950	0		0		0	
Jackson	13,366	0		0		0	
Jefferson	18,813	0		0		0	
Jewell	3,046	0		0		0	
Johnson	566,933	4	0.7	1	0.2	0	
Kearny	3,923	0		0		0	
Kingman	7,844	0		0		0	
Kiowa	2,523	0		0		0	
Labette	20,916	0		0		0	
Lane	1,720	0		0		0	
Leavenworth	78,185	1	1.3	0		0	
Lincoln	3,147	0		0		0	
Linn	9,516	0		0		0	
Logan	2,798	0		0		0	
Lyon	33,510	0		0		0	
Marion	12,219	0		0		0	
Marshall	10,002	0		0		0	
McPherson	29,569	0		0		0	
Meade	4,343	0		0		0	
Miami	32,835	0		0		0	
Mitchell	6,378	0		0		0	
Montgomery	34,292	0		0		0	
Morris	5,741	0		0		0	
Morton	3,143	0		0		0	
Nemaha	10,161	0		0		0	
Neosho	16,430	0		0		0	
Ness	3,073	0		0		0	
Norton	5,622	0		0		0	
Osage	16,142	0		0		0	
Osborne	3,818	0		0		0	
Ottawa	6,042	0		0		0	
Pawnee	6,971	0		0		0	
Phillips	5,540	0		0		0	
Pottawatomie	22,691	0		0		0	
Pratt	9,878	1	1.1	0		0	
Rawlins	2,589	0		0		0	
Reno	64,190	0		0		0	
Republic	4,820	0		0		0	
Rice	10,011	0		0		0	
Riley	75,394	0		0		0	
Rooks	5,190	0		0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Malaria (Plasmodium spp.)		Meningitis, Bacterial Other		Meningococcal disease (Neisseria meningitidis)	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Rush	3,186	0		0		0	
Russell	6,933	0		0		0	
Saline	55,740	1	1.8	1	1.8	0	
Scott	5,035	0		0		0	
Sedgwick	505,415	0		0		1	0.2
Seward	23,390	0		0		0	
Shawnee	178,831	0		1	0.6	0	
Sheridan	2,553	0		0		0	
Sherman	6,115	0		0		0	
Smith	3,706	0		0		0	
Stafford	4,359	0		0		0	
Stanton	2,194	0		0		0	
Stevens	5,816	0		0		0	
Sumner	23,591	0		0		0	
Thomas	7,948	0		0		0	
Trego	2,980	0		0		0	
Wabaunsee	7,051	0		0		0	
Wallace	1,569	0		0		0	
Washington	5,629	0		0		0	
Wichita	2,192	0		0		0	
Wilson	9,105	0		0		0	
Woodson	3,221	0		0		0	
Wyandotte	160,384	1	0.6	1	0.6	0	
Unknown		0		0		0	
Total	2,893,957	8	0.0	4	0.0	3	0.0

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Pertussis		Q Fever		Rabies, animal	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Allen	13,124	0		0		0	
Anderson	7,897	0		0		0	
Atchison	16,749	4	23.9	0		0	
Barber	4,947	1	2.2	0		0	
Barton	27,509	1	3.6	0		1	3.6
Bourbon	14,852	0		0		0	
Brown	9,997	1	1	0		0	
Butler	65,803	7	1.6	0		2	3
Chase	2,700	1	37	0		0	
Chautauqua	3,552	0		0		2	56.3
Cherokee	20,978	0		0		0	
Cheyenne	2,694	0		0		0	
Clark	2,193	0		0		0	
Clay	8,406	2	23.8	0		0	
Cloud	9,292	2	21.5	0		2	21.5
Coffey	8,412	0		0		2	23.8
Comanche	1,955	0		0		0	
Cowley	36,204	7	19.3	0		1	2.8
Crawford	39,278	7	17.8	0		1	2.5
Decatur	2,930	0		0		0	
Dickinson	19,609	1	5.1	0		0	
Doniphan	7,851	0		0		0	
Douglas	114,322	20	17.5	0		0	
Edwards	2,945	0		0		0	
Elk	2,655	0		0		0	
Ellis	29,061	1	3.4	0		0	
Ellsworth	6,398	0		0		0	
Finney	37,098	19	51.2	1	2.7	0	
Ford	34,819	3	8.6	0		2	5.7
Franklin	25,740	0		0		1	3.9
Geary	37,384	0		1	2.7	0	
Gove	2,769	0		0		1	36.1
Graham	2,593	0		0		0	
Grant	7,950	0		0		0	
Gray	6,009	1	16.6	0		1	16.6
Greeley	1,290	0		0		0	
Greenwood	6,424	1	15.6	0		2	31.1
Hamilton	2,609	0		0		0	
Harper	5,860	0		0		0	
Harvey	34,741	3	8.6	0		1	2.9
Haskell	4,141	1	24.1	0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Pertussis		Q Fever		Rabies, animal	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Hodgeman	1,950	1	51.3	0		0	
Jackson	13,366	1	7.5	0		0	
Jefferson	18,813	1	5.3	0		0	
Jewell	3,046	0		0		0	
Johnson	566,933	62	1.9	0		0	
Kearny	3,923	0		0		0	
Kingman	7,844	0		0		3	38.2
Kiowa	2,523	0		0		0	
Labette	20,916	1	4.8	0		0	
Lane	1,720	0		0		0	
Leavenworth	78,185	19	24.3	0		0	
Lincoln	3,147	0		0		0	
Linn	9,516	1	1.5	0		1	1.5
Logan	2,798	0		0		0	
Lyon	33,510	0		0		1	3
Marion	12,219	2	16.4	0		2	16.4
Marshall	10,002	0		0		0	
McPherson	29,569	0		1	3.4	2	6.8
Meade	4,343	0		0		0	
Miami	32,835	1	3	0		0	
Mitchell	6,378	0		0		2	31.4
Montgomery	34,292	4	11.7	0		1	2.9
Morris	5,741	0		0		0	
Morton	3,143	0		0		0	
Nemaha	10,161	0		0		1	9.8
Neosho	16,430	0		0		0	
Ness	3,073	1	32.5	0		1	32.5
Norton	5,622	0		0		0	
Osage	16,142	1	6.2	0		0	
Osborne	3,818	0		0		1	26.2
Ottawa	6,042	0		0		0	
Pawnee	6,971	12	172.1	0		0	
Phillips	5,540	0		0		0	
Pottawatomie	22,691	1	4.4	0		0	
Pratt	9,878	0		0		0	
Rawlins	2,589	0		0		0	
Reno	64,190	4	6.2	0		5	7.8
Republic	4,820	0		0		2	41.5
Rice	10,011	1	1	0		0	
Riley	75,394	3	4	0		0	
Rooks	5,190	1	19.3	1	19.3	0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Pertussis		Q Fever		Rabies, animal	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Rush	3,186	1	31.4	0		0	
Russell	6,933	0		0		2	28.8
Saline	55,740	0		0		4	7.2
Scott	5,035	1	19.9	0		0	
Sedgwick	505,415	137	27.1	0		5	1
Seward	23,390	1	4.3	0		0	
Shawnee	178,831	18	1.1	0		0	
Sheridan	2,553	0		0		0	
Sherman	6,115	0		0		1	16.4
Smith	3,706	0		0		0	
Stafford	4,359	3	68.8	0		0	
Stanton	2,194	0		0		0	
Stevens	5,816	0		0		1	17.2
Sumner	23,591	3	12.7	0		2	8.5
Thomas	7,948	2	25.2	0		0	
Trego	2,980	0		0		0	
Wabaunsee	7,051	2	28.4	0		0	
Wallace	1,569	0		0		1	63.7
Washington	5,629	0		0		1	17.8
Wichita	2,192	0		0		0	
Wilson	9,105	0		0		2	22
Woodson	3,221	0		0		0	
Wyandotte	160,384	37	23.1	0		0	
Unknown		0		0		0	
Total	2,893,957	405	0.0	3	0.0	60	0.0

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Salmonellosis		Shiga toxin-producing Escherichia coli (STEC)		Shigellosis	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Allen	13,124	2	15.2	0		0	
Anderson	7,897	2	25.3	0		0	
Atchison	16,749	2	11.9	0		0	
Barber	4,947	1	2.2	0		0	
Barton	27,509	4	14.5	0		0	
Bourbon	14,852	2	13.5	2	13.5	0	
Brown	9,997	0		0		0	
Butler	65,803	12	18.2	0		0	
Chase	2,700	0		0		0	
Chautauqua	3,552	0		1	28.2	0	
Cherokee	20,978	4	19.1	0		1	4.8
Cheyenne	2,694	0		0		0	
Clark	2,193	1	45.6	0		0	
Clay	8,406	1	11.9	0		0	
Cloud	9,292	2	21.5	0		0	
Coffey	8,412	0		0		0	
Comanche	1,955	0		0		0	
Cowley	36,204	11	3.4	2	5.5	1	2.8
Crawford	39,278	7	17.8	3	7.6	0	
Decatur	2,930	0		1	34.1	0	
Dickinson	19,609	5	25.5	0		0	
Doniphan	7,851	2	25.5	0		0	
Douglas	114,322	15	13.1	2	1.7	0	
Edwards	2,945	0		0		0	
Elk	2,655	0		0		0	
Ellis	29,061	3	1.3	3	1.3	0	
Ellsworth	6,398	0		1	15.6	0	
Finney	37,098	10	27	1	2.7	7	18.9
Ford	34,819	8	23	0		1	2.9
Franklin	25,740	5	19.4	1	3.9	0	
Geary	37,384	7	18.7	0		1	2.7
Gove	2,769	0		0		0	
Graham	2,593	6	231.4	1	38.6	0	
Grant	7,950	0		0		0	
Gray	6,009	1	16.6	0		0	
Greeley	1,290	0		0		0	
Greenwood	6,424	0		0		0	
Hamilton	2,609	1	38.3	0		1	38.3
Harper	5,860	0		0		0	
Harvey	34,741	5	14.4	2	5.8	1	2.9
Haskell	4,141	1	24.1	0		1	24.1

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Salmonellosis		Shiga toxin-producing Escherichia coli (STEC)		Shigellosis	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Hodgeman	1,950	0		0		0	
Jackson	13,366	5	37.4	1	7.5	0	
Jefferson	18,813	3	15.9	0		0	
Jewell	3,046	1	32.8	0		0	
Johnson	566,933	50	8.8	19	3.4	5	0.9
Kearny	3,923	1	25.5	1	25.5	0	
Kingman	7,844	3	38.2	0		0	
Kiowa	2,523	1	39.6	0		0	
Labette	20,916	3	14.3	0		0	
Lane	1,720	1	58.1	0		0	
Leavenworth	78,185	7	9	4	5.1	0	
Lincoln	3,147	0		0		0	
Linn	9,516	2	21	0		0	
Logan	2,798	1	35.7	0		0	
Lyon	33,510	5	14.9	1	3	1	3
Marion	12,219	0		0		0	
Marshall	10,002	6	6	0		0	
McPherson	29,569	4	13.5	1	3.4	0	
Meade	4,343	0		0		0	
Miami	32,835	9	27.4	0		1	3
Mitchell	6,378	3	47	0		0	
Montgomery	34,292	3	8.7	0		0	
Morris	5,741	2	34.8	0		1	17.4
Morton	3,143	0		0		0	
Nemaha	10,161	6	59	1	9.8	0	
Neosho	16,430	3	18.3	1	6.1	0	
Ness	3,073	1	32.5	1	32.5	0	
Norton	5,622	2	35.6	0		0	
Osage	16,142	1	6.2	0		0	
Osborne	3,818	0		0		0	
Ottawa	6,042	1	16.6	1	16.6	0	
Pawnee	6,971	3	43	1	14.3	0	
Phillips	5,540	0		0		0	
Pottawatomie	22,691	5	22	0		0	
Pratt	9,878	2	2.2	1	1.1	0	
Rawlins	2,589	0		0		0	
Reno	64,190	9	14	2	3.1	1	1.6
Republic	4,820	0		1	2.7	0	
Rice	10,011	1	1	0		0	
Riley	75,394	8	1.6	3	4	1	1.3
Rooks	5,190	3	57.8	0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Salmonellosis		Shiga toxin-producing Escherichia coli (STEC)		Shigellosis	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Rush	3,186	0		0		0	
Russell	6,933	0		0		0	
Saline	55,740	7	12.6	0		0	
Scott	5,035	0		1	19.9	0	
Sedgwick	505,415	55	1.9	7	1.4	4	0.8
Seward	23,390	3	12.8	0		0	
Shawnee	178,831	32	17.9	8	4.5	1	0.6
Sheridan	2,553	2	78.3	0		0	
Sherman	6,115	3	49.1	1	16.4	0	
Smith	3,706	2	54	2	54	0	
Stafford	4,359	5	114.7	1	22.9	0	
Stanton	2,194	2	91.2	0		0	
Stevens	5,816	0		0		0	
Sumner	23,591	6	25.4	1	4.2	2	8.5
Thomas	7,948	4	5.3	0		0	
Trego	2,980	2	67.1	0		0	
Wabaunsee	7,051	2	28.4	0		0	
Wallace	1,569	1	63.7	1	63.7	0	
Washington	5,629	1	17.8	0		0	
Wichita	2,192	3	136.9	0		0	
Wilson	9,105	2	22	0		0	
Woodson	3,221	2	62.1	0		0	
Wyandotte	160,384	15	9.4	8	5	9	5.6
Unknown		0		0		0	
Total	2,893,957	424	0.0	89	0.0	40	0.0

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Spotted Fever Rickettsiosis (RMSF)		Streptococcal disease, invasive, Group A		Streptococcal disease, invasive, Group B	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Allen	13,124	1	7.6	0		0	
Anderson	7,897	1	12.7	0		0	
Atchison	16,749	0		1	6	0	
Barber	4,947	1	2.2	0		0	
Barton	27,509	4	14.5	0		0	
Bourbon	14,852	2	13.5	0		0	
Brown	9,997	0		0		0	
Butler	65,803	4	6.1	0		0	
Chase	2,700	0		0		0	
Chautauqua	3,552	0		0		0	
Cherokee	20,978	6	28.6	0		0	
Cheyenne	2,694	0		0		0	
Clark	2,193	0		0		0	
Clay	8,406	0		0		0	
Cloud	9,292	0		1	1.8	0	
Coffey	8,412	4	47.6	0		0	
Comanche	1,955	1	51.2	0		0	
Cowley	36,204	3	8.3	0		0	
Crawford	39,278	8	2.4	0		0	
Decatur	2,930	0		0		0	
Dickinson	19,609	4	2.4	0		0	
Doniphan	7,851	0		0		0	
Douglas	114,322	19	16.6	3	2.6	0	
Edwards	2,945	0		0		0	
Elk	2,655	1	37.7	0		0	
Ellis	29,061	0		0		0	
Ellsworth	6,398	0		0		0	
Finney	37,098	0		0		0	
Ford	34,819	0		0		0	
Franklin	25,740	5	19.4	0		0	
Geary	37,384	2	5.3	0		0	
Gove	2,769	0		0		0	
Graham	2,593	0		0		0	
Grant	7,950	0		0		0	
Gray	6,009	0		0		0	
Greeley	1,290	0		0		0	
Greenwood	6,424	0		0		0	
Hamilton	2,609	0		0		0	
Harper	5,860	0		0		0	
Harvey	34,741	0		1	2.9	0	
Haskell	4,141	0		0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Spotted Fever Rickettsiosis (RMSF)		Streptococcal disease, invasive, Group A		Streptococcal disease, invasive, Group B	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Hodgeman	1,950	0		0		0	
Jackson	13,366	1	7.5	0		0	
Jefferson	18,813	5	26.6	0		0	
Jewell	3,046	0		0		0	
Johnson	566,933	18	3.2	16	2.8	0	
Kearny	3,923	0		0		0	
Kingman	7,844	1	12.7	0		0	
Kiowa	2,523	0		0		0	
Labette	20,916	12	57.4	0		0	
Lane	1,720	0		0		0	
Leavenworth	78,185	2	2.6	1	1.3	0	
Lincoln	3,147	0		0		0	
Linn	9,516	2	21	1	1.5	0	
Logan	2,798	0		0		0	
Lyon	33,510	3	9	1	3	0	
Marion	12,219	2	16.4	0		0	
Marshall	10,002	0		0		0	
McPherson	29,569	4	13.5	0		0	
Meade	4,343	0		0		0	
Miami	32,835	0		0		0	
Mitchell	6,378	0		0		0	
Montgomery	34,292	2	5.8	0		0	
Morris	5,741	0		0		0	
Morton	3,143	0		0		0	
Nemaha	10,161	5	49.2	0		0	
Neosho	16,430	3	18.3	0		0	
Ness	3,073	0		0		0	
Norton	5,622	0		0		0	
Osage	16,142	0		0		0	
Osborne	3,818	0		0		0	
Ottawa	6,042	0		0		0	
Pawnee	6,971	0		1	14.3	0	
Phillips	5,540	0		0		0	
Pottawatomie	22,691	2	8.8	0		0	
Pratt	9,878	1	1.1	0		0	
Rawlins	2,589	1	38.6	0		0	
Reno	64,190	5	7.8	1	1.6	0	
Republic	4,820	0		0		0	
Rice	10,011	0		0		0	
Riley	75,394	2	2.7	0		0	
Rooks	5,190	0		0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Spotted Fever Rickettsiosis (RMSF)		Streptococcal disease, invasive, Group A		Streptococcal disease, invasive, Group B	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Rush	3,186	0		0		0	
Russell	6,933	1	14.4	0		0	
Saline	55,740	2	3.6	4	7.2	0	
Scott	5,035	0		0		0	
Sedgwick	505,415	7	1.4	3	0.6	0	
Seward	23,390	0		0		0	
Shawnee	178,831	12	6.7	0		1	0.6
Sheridan	2,553	0		0		0	
Sherman	6,115	0		0		0	
Smith	3,706	0		0		0	
Stafford	4,359	0		0		0	
Stanton	2,194	0		0		0	
Stevens	5,816	0		0		0	
Sumner	23,591	0		0		0	
Thomas	7,948	0		0		0	
Trego	2,980	0		1	33.6	0	
Wabaunsee	7,051	1	14.2	0		0	
Wallace	1,569	0		0		0	
Washington	5,629	0		0		0	
Wichita	2,192	0		0		0	
Wilson	9,105	3	32.9	0		0	
Woodson	3,221	2	62.1	0		0	
Wyandotte	160,384	3	1.9	2	1.2	0	
Unknown		0		0		0	
Total	2,893,957	168	0.0	37	0.0	1	0.0

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Streptococcus pneumoniae, invasive disease		Transmissible Spongioform Enceph (TSE / CJD)		Tularemia (Francisella tularensis)	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Allen	13,124	2	15.2	0		0	
Anderson	7,897	0		0		0	
Atchison	16,749	4	23.9	0		0	
Barber	4,947	0		0		0	
Barton	27,509	1	3.6	0		0	
Bourbon	14,852	1	6.7	0		0	
Brown	9,997	0		0		0	
Butler	65,803	1	1.5	0		0	
Chase	2,700	0		0		0	
Chautauqua	3,552	0		0		1	28.2
Cherokee	20,978	0		0		2	9.5
Cheyenne	2,694	0		0		0	
Clark	2,193	0		0		0	
Clay	8,406	2	23.8	0		0	
Cloud	9,292	0		0		0	
Coffey	8,412	0		0		0	
Comanche	1,955	0		0		0	
Cowley	36,204	0		0		2	5.5
Crawford	39,278	0		0		1	2.5
Decatur	2,930	0		0		0	
Dickinson	19,609	0		0		0	
Doniphan	7,851	0		0		0	
Douglas	114,322	6	5.2	0		3	2.6
Edwards	2,945	0		0		0	
Elk	2,655	0		0		0	
Ellis	29,061	0		0		0	
Ellsworth	6,398	1	15.6	0		0	
Finney	37,098	9	24.3	0		0	
Ford	34,819	0		0		0	
Franklin	25,740	0		0		0	
Geary	37,384	5	13.4	0		2	5.3
Gove	2,769	0		0		0	
Graham	2,593	0		0		0	
Grant	7,950	0		0		0	
Gray	6,009	0		0		0	
Greeley	1,290	0		0		0	
Greenwood	6,424	0		0		0	
Hamilton	2,609	0		0		0	
Harper	5,860	0		0		0	
Harvey	34,741	1	2.9	0		1	2.9
Haskell	4,141	0		0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Streptococcus pneumoniae, invasive disease		Transmissible Spongioform Enceph (TSE / CJD)		Tularemia (Francisella tularensis)	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Hodgeman	1,950	0		0		0	
Jackson	13,366	1	7.5	0		0	
Jefferson	18,813	1	5.3	0		2	1.6
Jewell	3,046	0		0		0	
Johnson	566,933	23	4.1	0		0	
Kearny	3,923	0		0		0	
Kingman	7,844	0		0		0	
Kiowa	2,523	0		0		0	
Labette	20,916	0		0		0	
Lane	1,720	0		0		0	
Leavenworth	78,185	4	5.1	0		0	
Lincoln	3,147	0		0		0	
Linn	9,516	0		0		0	
Logan	2,798	0		0		0	
Lyon	33,510	3	9	0		1	3
Marion	12,219	0		0		1	8.2
Marshall	10,002	0		0		0	
McPherson	29,569	1	3.4	0		0	
Meade	4,343	0		0		0	
Miami	32,835	4	12.2	0		0	
Mitchell	6,378	0		1	15.7	0	
Montgomery	34,292	1	2.9	0		0	
Morris	5,741	0		0		0	
Morton	3,143	0		0		0	
Nemaha	10,161	0		0		1	9.8
Neosho	16,430	2	12.2	0		1	6.1
Ness	3,073	0		0		0	
Norton	5,622	0		0		0	
Osage	16,142	0		0		0	
Osborne	3,818	0		0		0	
Ottawa	6,042	1	16.6	0		0	
Pawnee	6,971	0		0		0	
Phillips	5,540	0		0		0	
Pottawatomie	22,691	1	4.4	0		0	
Pratt	9,878	0		0		0	
Rawlins	2,589	0		0		0	
Reno	64,190	11	17.1	1	1.6	0	
Republic	4,820	0		0		0	
Rice	10,011	1	1	0		0	
Riley	75,394	0		0		2	2.7
Rooks	5,190	0		0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Streptococcus pneumoniae, invasive disease		Transmissible Spongioform Enceph (TSE / CJD)		Tularemia (Francisella tularensis)	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Rush	3,186	0		0		0	
Russell	6,933	0		0		0	
Saline	55,740	10	17.9	0		2	3.6
Scott	5,035	0		0		0	
Sedgwick	505,415	29	5.7	0		2	0.4
Seward	23,390	1	4.3	0		0	
Shawnee	178,831	16	8.9	0		4	2.2
Sheridan	2,553	0		0		0	
Sherman	6,115	0		0		0	
Smith	3,706	0		0		0	
Stafford	4,359	0		0		0	
Stanton	2,194	0		0		0	
Stevens	5,816	0		0		0	
Sumner	23,591	0		0		0	
Thomas	7,948	0		0		0	
Trego	2,980	0		0		0	
Wabaunsee	7,051	0		0		0	
Wallace	1,569	0		0		0	
Washington	5,629	0		0		0	
Wichita	2,192	0		0		0	
Wilson	9,105	0		0		0	
Woodson	3,221	1	31	0		0	
Wyandotte	160,384	5	3.1	0		0	
Unknown		0		0		0	
Total	2,893,957	149	0.0	2	0.0	28	0.0

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Typhoid Fever (Salmonella typhi)		Vancomycin-intermediate Staphylococcus aureus (VISA)		Varicella (Chickenpox)	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Allen	13,124	0		0		1	7.6
Anderson	7,897	0		0		0	
Atchison	16,749	0		0		3	17.9
Barber	4,947	0		0		3	6.6
Barton	27,509	0		0		2	7.3
Bourbon	14,852	0		0		2	13.5
Brown	9,997	0		0		0	
Butler	65,803	0		0		14	21.3
Chase	2,700	0		0		0	
Chautauqua	3,552	0		0		0	
Cherokee	20,978	0		0		2	9.5
Cheyenne	2,694	0		0		0	
Clark	2,193	0		0		0	
Clay	8,406	0		0		0	
Cloud	9,292	0		0		1	1.8
Coffey	8,412	0		0		0	
Comanche	1,955	0		0		0	
Cowley	36,204	0		0		11	3.4
Crawford	39,278	0		0		2	5.1
Decatur	2,930	0		0		0	
Dickinson	19,609	0		0		3	15.3
Doniphan	7,851	0		0		0	
Douglas	114,322	0		0		16	14
Edwards	2,945	0		0		0	
Elk	2,655	0		0		1	37.7
Ellis	29,061	0		0		1	3.4
Ellsworth	6,398	0		0		0	
Finney	37,098	0		0		6	16.2
Ford	34,819	0		0		6	17.2
Franklin	25,740	0		0		1	3.9
Geary	37,384	0		0		1	2.7
Gove	2,769	0		0		2	72.2
Graham	2,593	0		0		0	
Grant	7,950	0		0		0	
Gray	6,009	0		0		1	16.6
Greeley	1,290	0		0		0	
Greenwood	6,424	0		0		0	
Hamilton	2,609	0		0		0	
Harper	5,860	0		0		1	17.1
Harvey	34,741	0		0		2	5.8
Haskell	4,141	0		0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Typhoid Fever (Salmonella typhi)		Vancomycin-intermediate Staphylococcus aureus (VISA)		Varicella (Chickenpox)	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Hodgeman	1,950	0		0		0	
Jackson	13,366	0		0		17	127.2
Jefferson	18,813	0		0		9	47.8
Jewell	3,046	0		0		0	
Johnson	566,933	0		1	0.2	57	1.1
Kearny	3,923	0		0		0	
Kingman	7,844	0		0		8	12
Kiowa	2,523	0		0		1	39.6
Labette	20,916	0		0		6	28.7
Lane	1,720	0		0		0	
Leavenworth	78,185	0		0		5	6.4
Lincoln	3,147	0		0		0	
Linn	9,516	0		0		0	
Logan	2,798	0		0		1	35.7
Lyon	33,510	0		0		4	11.9
Marion	12,219	0		0		0	
Marshall	10,002	0		0		1	1
McPherson	29,569	0		0		3	1.1
Meade	4,343	0		0		0	
Miami	32,835	0		0		0	
Mitchell	6,378	0		0		0	
Montgomery	34,292	0		0		3	8.7
Morris	5,741	0		0		1	17.4
Morton	3,143	0		0		0	
Nemaha	10,161	0		0		1	9.8
Neosho	16,430	0		0		1	6.1
Ness	3,073	0		0		1	32.5
Norton	5,622	0		0		0	
Osage	16,142	0		0		0	
Osborne	3,818	0		0		1	26.2
Ottawa	6,042	0		0		0	
Pawnee	6,971	0		0		3	43
Phillips	5,540	0		0		0	
Pottawatomie	22,691	0		0		78	343.7
Pratt	9,878	0		0		0	
Rawlins	2,589	0		0		0	
Reno	64,190	0		0		7	1.9
Republic	4,820	0		0		0	
Rice	10,011	0		0		4	4
Riley	75,394	0		0		1	1.3
Rooks	5,190	0		0		0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Typhoid Fever (Salmonella typhi)		Vancomycin-intermediate Staphylococcus aureus (VISA)		Varicella (Chickenpox)	
County	County Pop.	Count	Rate^	Count	Rate^	Count	Rate^
Rush	3,186	0		0		0	
Russell	6,933	0		0		0	
Saline	55,740	0		0		8	14.4
Scott	5,035	0		0		0	
Sedgwick	505,415	2	0.4	0		61	12.1
Seward	23,390	0		0		0	
Shawnee	178,831	0		0		49	27.4
Sheridan	2,553	0		0		0	
Sherman	6,115	0		0		2	32.7
Smith	3,706	0		0		1	27
Stafford	4,359	0		0		7	16.6
Stanton	2,194	0		0		0	
Stevens	5,816	0		0		0	
Sumner	23,591	0		0		0	
Thomas	7,948	0		0		0	
Trego	2,980	0		0		0	
Wabaunsee	7,051	0		0		23	326.2
Wallace	1,569	0		0		0	
Washington	5,629	0		0		0	
Wichita	2,192	0		0		2	91.2
Wilson	9,105	0		0		0	
Woodson	3,221	0		0		0	
Wyandotte	160,384	0		0		8	5
Unknown		0		0		0	
Total	2,893,957	2	0.0	1	0.0	456	0.0

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Yersiniosis	
County	County Pop.	Count	Rate^
Allen	13,124	0	
Anderson	7,897	0	
Atchison	16,749	0	
Barber	4,947	0	
Barton	27,509	0	
Bourbon	14,852	1	6.7
Brown	9,997	0	
Butler	65,803	0	
Chase	2,700	0	
Chautauqua	3,552	0	
Cherokee	20,978	0	
Cheyenne	2,694	0	
Clark	2,193	0	
Clay	8,406	0	
Cloud	9,292	0	
Coffey	8,412	0	
Comanche	1,955	0	
Cowley	36,204	0	
Crawford	39,278	0	
Decatur	2,930	0	
Dickinson	19,609	0	
Doniphan	7,851	0	
Douglas	114,322	0	
Edwards	2,945	0	
Elk	2,655	0	
Ellis	29,061	0	
Ellsworth	6,398	0	
Finney	37,098	0	
Ford	34,819	0	
Franklin	25,740	0	
Geary	37,384	0	
Gove	2,769	0	
Graham	2,593	0	
Grant	7,950	0	
Gray	6,009	0	
Greeley	1,290	0	
Greenwood	6,424	0	
Hamilton	2,609	0	
Harper	5,860	0	
Harvey	34,741	0	
Haskell	4,141	0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Yersiniosis	
County	County Pop.	Count	Rate^
Hodgeman	1,950	0	
Jackson	13,366	0	
Jefferson	18,813	0	
Jewell	3,046	0	
Johnson	566,933	1	0.2
Kearny	3,923	0	
Kingman	7,844	0	
Kiowa	2,523	0	
Labette	20,916	0	
Lane	1,720	0	
Leavenworth	78,185	0	
Lincoln	3,147	0	
Linn	9,516	0	
Logan	2,798	0	
Lyon	33,510	0	
Marion	12,219	0	
Marshall	10,002	0	
McPherson	29,569	0	
Meade	4,343	0	
Miami	32,835	0	
Mitchell	6,378	0	
Montgomery	34,292	0	
Morris	5,741	0	
Morton	3,143	0	
Nemaha	10,161	0	
Neosho	16,430	0	
Ness	3,073	0	
Norton	5,622	0	
Osage	16,142	0	
Osborne	3,818	0	
Ottawa	6,042	0	
Pawnee	6,971	0	
Phillips	5,540	0	
Pottawatomie	22,691	0	
Pratt	9,878	0	
Rawlins	2,589	0	
Reno	64,190	0	
Republic	4,820	0	
Rice	10,011	0	
Riley	75,394	0	
Rooks	5,190	0	

^ Rate per 100,000 population

APPENDIX B: REPORTABLE INFECTIOUS DISEASE INCIDENCE BY COUNTY, KANSAS, 2013

		Yersiniosis	
County	**County Pop.**	**Count**	**Rate^**
Rush	3,186	0	
Russell	6,933	0	
Saline	55,740	0	
Scott	5,035	0	
Sedgwick	505,415	0	
Seward	23,390	0	
Shawnee	178,831	0	
Sheridan	2,553	0	
Sherman	6,115	0	
Smith	3,706	0	
Stafford	4,359	0	
Stanton	2,194	0	
Stevens	5,816	0	
Sumner	23,591	0	
Thomas	7,948	0	
Trego	2,980	0	
Wabaunsee	7,051	0	
Wallace	1,569	0	
Washington	5,629	0	
Wichita	2,192	0	
Wilson	9,105	0	
Woodson	3,221	0	
Wyandotte	160,384	0	
Unknown		0	
Total	2,893,957	2	0.0

^ Rate per 100,000 population

APPENDIX C: REPORTABLE DISEASES BY DEMOGRAPHIC CHARACTERISTIC

TABLE 1: REPORTABLE DISEASES BY AGE GROUP, KANSAS, 2013

Disease	0 to 4		5 to 14		15 to 24		25 to 34	
	Cases	Rate^	Cases	Rate^	Cases	Rate^	Cases	Rate^
Amebiasis (Entamoeba histolytica)	0		0		1	0.24	1	0.26
Arboviral Disease	0		1	0.25	3	0.72	6	1.55
Botulism	1	0.50	0		0		0	
Campylobacteriosis	28	13.97	39	9.62	55	13.14	40	10.33
Carbapenem-resistant Enterobacteriaceae	0		0		0		0	
Clostridium perfringens food intoxication	0		0		0		0	
Coccidioidomycosis	0		0		0		1	0.26
Cryptosporidiosis	5	2.49	14	3.45	19	4.54	20	5.16
Cyclosporiasis	0		0		0		1	0.26
Ehrlichiosis/Anaplasmosis	0		3	0.74	6	1.43	9	2.32
Giardiasis	17	8.48	10	2.47	11	2.63	18	4.65
HUS - Hemolytic Uremic Syndrome postdiarrheal	3	1.50	1	0.25	0		0	
Haemophilus influenzae, invasive disease (Including Hib)	5	2.49	4	0.99	1	0.24	1	0.26
Harmful Algal Bloom Illness - Animal	0		0		0		0	
Hepatitis A	0		2	0.49	1	0.24	1	0.26
Hepatitis B virus infection, chronic	0		1	0.25	9	2.15	24	6.20
Hepatitis B virus infection, perinatal	1	0.50	0		0		0	
Hepatitis B, acute	0		0		1	0.24	2	0.52
Hepatitis C virus, past or present	2	1.00	2	0.49	99	23.65	193	49.82
Hepatitis C, acute	0		0		3	0.72	6	1.55
Influenza-associated pediatric mortality	1	0.50	0		0		0	
Legionellosis	0		0		0		0	
Listeriosis	0		0		0		0	
Lyme Disease (Borrelia burgdorferi)	1	0.50	5	1.23	8	1.91	2	0.52
Malaria (Plasmodium spp.)	0		0		1	0.24	1	0.26
Meningitis, Bacterial Other	0		0		1	0.24	0	
Meningococcal disease (Neisseria meningitidis)	0		0		1	0.24	0	
Pertussis	71	35.43	170	41.94	52	12.42	21	5.42
Q Fever	0		0		0		0	
Rabies, animal	0		0		0		0	
Salmonellosis	80	39.92	58	14.31	42	10.03	45	11.62
Shiga toxin-producing Escherichia coli (STEC)	22	10.98	15	3.70	17	4.06	13	3.36
Shigellosis	10	4.99	9	2.22	4	0.96	5	1.29
Spotted Fever Rickettsiosis (RMSF)	2	1.00	10	2.47	11	2.63	16	4.13
Streptococcal disease, invasive, Group A	2	1.00	4	0.99	0		2	0.52
Streptococcal disease, invasive, Group B	0		0		0		0	
Streptococcus pneumoniae, invasive disease	9	4.49	4	0.99	1	0.24	3	0.77
Transmissible Spongioform Encephalitis (TSE / CJD)	0		0		0		0	
Tularemia (Francisella tularensis)	0		6	1.48	1	0.24	4	1.03
Typhoid Fever (Salmonella typhi)	0		0		0		1	0.26
Vancomycin-intermediate Staphylococcus aureus (VISA)	0		0		0		0	
Varicella (Chickenpox)	178	88.82	233	57.49	30	7.17	4	1.03
Yersiniosis	0		1	0.25	0		0	

^ Rate per 100,000 population

Appendix C: Reportable Diseases by Demographic Characteristic

Table 1: Reportable Diseases by Age Group, Kansas, 2013

Disease	35 to 44		45 to 54		55 to 64		65 and Above		Unknown
	Cases	Rate^	Cases	Rate^	Cases	Rate^	Cases	Rate^	Cases
Amebiasis (Entamoeba histolytica)	1	0.29	1	0.27	0		0		0
Arboviral Disease	13	3.78	13	3.45	23	6.45	33	8.15	0
Botulism	0		0		0		0		0
Campylobacteriosis	41	11.93	46	12.22	33	9.25	45	11.11	1
Carbapenem-resistant Enterobacteriaceae	0		0		0		1	0.25	0
Clostridium perfringens food intoxication	0		0		0		0		15
Coccidioidomycosis	0		1	0.27	1	0.28	0		0
Cryptosporidiosis	11	3.20	7	1.86	6	1.68	18	4.44	0
Cyclosporiasis	1	0.29	0		1	0.28	1	0.25	0
Ehrlichiosis/Anaplasmosis	16	4.65	18	4.78	17	4.76	27	6.67	0
Giardiasis	15	4.36	13	3.45	13	3.64	7	1.73	0
HUS - Hemolytic Uremic Syndrome postdiarrheal	0		0		0		0		0
Haemophilus influenzae, invasive disease (Including Hib)	3	0.87	1	0.27	7	1.96	18	4.44	0
Harmful Algal Bloom Illness - Animal	0		0		0		0		1
Hepatitis A	2	0.58	2	0.53	2	0.56	1	0.25	0
Hepatitis B virus infection, chronic	24	6.98	23	6.11	13	3.64	10	2.47	0
Hepatitis B virus infection, perinatal	0		0		0		0		0
Hepatitis B, acute	3	0.87	2	0.53	1	0.28	1	0.25	0
Hepatitis C virus, past or present	226	65.73	488	129.63	430	120.50	88	21.73	0
Hepatitis C, acute	4	1.16	2	0.53	1	0.28	1	0.25	0
Influenza-associated pediatric mortality	0		0		0		0		0
Legionellosis	1	0.29	1	0.27	6	1.68	10	2.47	0
Listeriosis	0		0		0		3	0.74	0
Lyme Disease (Borrelia burgdorferi)	7	2.04	6	1.59	2	0.56	3	0.74	0
Malaria (Plasmodium spp.)	1	0.29	4	1.06	1	0.28	0		0
Meningitis, Bacterial Other	0		0		2	0.56	1	0.25	0
Meningococcal disease (Neisseria meningitidis)	0		0		1	0.28	1	0.25	0
Pertussis	34	9.89	24	6.38	16	4.48	16	3.95	1
Q Fever	1	0.29	0		2	0.56	1	0.25	0
Rabies, animal	0		0		0		0		60
Salmonellosis	36	10.47	44	11.69	44	12.33	74	18.27	1
Shiga toxin-producing Escherichia coli (STEC)	6	1.75	2	0.53	6	1.68	8	1.98	0
Shigellosis	3	0.87	0		6	1.68	3	0.74	0
Spotted Fever Rickettsiosis (RMSF)	20	5.82	37	9.83	36	10.09	36	8.89	0
Streptococcal disease, invasive, Group A	2	0.58	8	2.13	3	0.84	16	3.95	0
Streptococcal disease, invasive, Group B	0		0		1	0.28	0		0
Streptococcus pneumoniae, invasive disease	5	1.45	23	6.11	33	9.25	71	17.53	0
Transmissible Spongioform Encephalitis (TSE / CJD)	0		0		1	0.28	1	0.25	0
Tularemia (Francisella tularensis)	2	0.58	9	2.39	2	0.56	4	0.99	0
Typhoid Fever (Salmonella typhi)	0		1	0.27	0		0		0
Vancomycin-intermediate Staphylococcus aureus (VISA)	0		0		0		1	0.25	0
Varicella (Chickenpox)	5	1.45	1	0.27	1	0.28	4	0.99	0
Yersiniosis	0		0		0		1	0.25	0

^ Rate per 100,000 population

Appendix C: Reportable Diseases by Demographic Characteristic

Table 2: Reportable Diseases by Race, Kansas, 2013

	White		Black/ African American		Native American/ Alaskan Native	
Disease	**Cases**	**Rate^**	**Cases**	**Rate^**	**Cases**	**Rate^**
Amebiasis (Entamoeba histolytica)	4	0.16	0		0	
Arboviral Disease	82	3.20	2	0.98	0	
Botulism	1	0.04	0		0	
Campylobacteriosis	293	11.44	5	2.44	2	4.74
Carbapenem-resistant Enterobacteriaceae	1	0.04	0		0	
Clostridium perfringens food intoxication	15	0.59	0		0	
Coccidioidomycosis	1	0.04	0		0	
Cryptosporidiosis	83	3.24	2	0.98	0	
Cyclosporiasis	3	0.12	0		0	
Ehrlichiosis/Anaplasmosis	88	3.44	0		1	2.37
Giardiasis	84	3.28	6	2.93	1	2.37
HUS - Hemolytic Uremic Syndrome postdiarrheal	4	0.16	0		0	
Haemophilus influenzae, invasive disease (Including Hib)	36	1.41	4	1.95	0	
Harmful Algal Bloom Illness - Animal	0		0		0	
Hepatitis A	9	0.35	0		0	
Hepatitis B virus infection, chronic	19	0.74	12	5.85	0	
Hepatitis B virus infection, perinatal	1	0.04	0		0	
Hepatitis B, acute	8	0.31	1	0.49	0	
Hepatitis C virus, past or present	859	33.55	113	55.11	20	47.41
Hepatitis C, acute	15	0.59	1	0.49	0	
Influenza-associated pediatric mortality	1	0.04	0		0	
Legionellosis	14	0.55	3	1.46	0	
Listeriosis	2	0.08	1	0.49	0	
Lyme Disease (Borrelia burgdorferi)	28	1.09	1	0.49	0	
Malaria (Plasmodium spp.)	5	0.20	2	0.98	0	
Meningitis, Bacterial Other	4	0.16	0		0	
Meningococcal disease (Neisseria meningitidis)	3	0.12	0		0	
Pertussis	382	14.92	12	5.85	2	4.74
Q Fever	4	0.16	0		0	
Rabies, animal	0		0		0	
Salmonellosis	334	13.05	30	14.63	2	4.74
Shiga toxin-producing Escherichia coli (STEC)	73	2.85	2	0.98	0	
Shigellosis	35	1.37	3	1.46	0	
Spotted Fever Rickettsiosis (RMSF)	154	6.02	1	0.49	1	2.37
Streptococcal disease, invasive, Group A	32	1.25	2	0.98	0	
Streptococcal disease, invasive, Group B	1	0.04	0		0	
Streptococcus pneumoniae, invasive disease	125	4.88	12	5.85	1	2.37
Transmissible Spongioform Enceph (TSE / CJD)	1	0.04	0		0	
Tularemia (Francisella tularensis)	27	1.05	1	0.49	0	
Typhoid Fever (Salmonella typhi)	0		0		0	
Vancomycin-intermediate Staphylococcus aureus (VISA)	1	0.04	0		0	
Varicella (Chickenpox)	426	16.64	15	7.32	1	2.37
Yersiniosis	2	0.08	0		0	

^ Rate per 100,000 population

APPENDIX C: REPORTABLE DISEASES BY DEMOGRAPHIC CHARACTERISTIC

TABLE 2: REPORTABLE DISEASES BY RACE, KANSAS, 2013

	Asian/ Native Hawaiian/ Pacific Islander		Other	Unknown
Disease	**Cases**	**Rate^**	**Cases**	**Cases**
Amebiasis (Entamoeba histolytica)	0		0	0
Arboviral Disease	0		0	8
Botulism	0		0	0
Campylobacteriosis	6	6.93	1	21
Carbapenem-resistant Enterobacteriaceae	0		0	0
Clostridium perfringens food intoxication	0		0	0
Coccidioidomycosis	0		0	2
Cryptosporidiosis	1	1.16	0	14
Cyclosporiasis	0		0	1
Ehrlichiosis/Anaplasmosis	1	1.16	0	6
Giardiasis	7	8.09	0	6
HUS - Hemolytic Uremic Syndrome postdiarrheal	0		0	0
Haemophilus influenzae, invasive disease (Including Hib)	0		0	0
Harmful Algal Bloom Illness - Animal	0		0	1
Hepatitis A	1	1.16	0	1
Hepatitis B virus infection, chronic	53	61.26	2	18
Hepatitis B virus infection, perinatal	0		0	0
Hepatitis B, acute	0		0	1
Hepatitis C virus, past or present	8	9.25	3	525
Hepatitis C, acute	0		0	1
Influenza-associated pediatric mortality	0		0	0
Legionellosis	0		0	1
Listeriosis	0		0	0
Lyme Disease (Borrelia burgdorferi)	2	2.31	0	3
Malaria (Plasmodium spp.)	1	1.16	0	0
Meningitis, Bacterial Other	0		0	0
Meningococcal disease (Neisseria meningitidis)	0		0	0
Pertussis	3	3.47	2	4
Q Fever	0		0	0
Rabies, animal	0		0	60
Salmonellosis	9	10.40	2	47
Shiga toxin-producing Escherichia coli (STEC)	1	1.16	0	13
Shigellosis	0		0	2
Spotted Fever Rickettsiosis (RMSF)	1	1.16	0	11
Streptococcal disease, invasive, Group A	1	1.16	0	2
Streptococcal disease, invasive, Group B	0		0	0
Streptococcus pneumoniae, invasive disease	2	2.31	0	9
Transmissible Spongioform Enceph (TSE / CJD)	0		0	1
Tularemia (Francisella tularensis)	0		0	0
Typhoid Fever (Salmonella typhi)	2	2.31	0	0
Vancomycin-intermediate Staphylococcus aureus (VISA)	0		0	0
Varicella (Chickenpox)	6	6.93	0	8
Yersiniosis	0		0	0

Something

^ Rate per 100,000 population

APPENDIX C: REPORTABLE DISEASES BY DEMOGRAPHIC CHARACTERISTIC

TABLE 3: REPORTABLE DISEASES BY ETHNICITY, KANSAS, 2013

	Hispanic		Non-Hispanic		Unknown
Disease	**Cases**	**Rate^**	**Cases**	**Rate^**	**Cases**
Amebiasis (Entamoeba histolytica)	1	0.31	3	0.12	0
Arboviral Disease	3	0.93	80	3.11	9
Botulism	0		1	0.04	0
Campylobacteriosis	33	10.2	269	10.47	26
Carbapenem-resistant Enterobacteriaceae	0		1	0.04	0
Clostridium perfringens food intoxication	0		14	0.54	1
Coccidioidomycosis	0		2	0.08	1
Cryptosporidiosis	9	2.78	76	2.96	15
Cyclosporiasis	0		3	0.12	1
Ehrlichiosis/Anaplasmosis	3	0.93	84	3.27	9
Giardiasis	10	3.09	86	3.35	8
HUS - Hemolytic Uremic Syndrome postdiarrheal	0		4	0.16	0
Haemophilus influenzae, invasive disease (Including Hib)	6	1.85	32	1.24	2
Harmful Algal Bloom Illness - Animal	0		0		1
Hepatitis A	1	0.31	9	0.35	1
Hepatitis B virus infection, chronic	1	0.31	84	3.27	19
Hepatitis B virus infection, perinatal	0		1	0.04	0
Hepatitis B, acute	2	0.62	7	0.27	1
Hepatitis C virus, past or present	53	16.38	919	35.75	556
Hepatitis C, acute	0		16	0.62	1
Influenza-associated pediatric mortality	0		1	0.04	0
Legionellosis	1	0.31	16	0.62	1
Listeriosis	0		3	0.12	0
Lyme Disease (Borrelia burgdorferi)	0		30	1.17	4
Malaria (Plasmodium spp.)	0		7	0.27	1
Meningitis, Bacterial Other	0		4	0.16	0
Meningococcal disease (Neisseria meningitidis)	0		3	0.12	0
Pertussis	42	12.98	355	13.81	8
Q Fever	1	0.31	3	0.12	0
Rabies, animal	0		0		60
Salmonellosis	27	8.34	336	13.07	61
Shiga toxin-producing Escherichia coli (STEC)	6	1.85	68	2.65	15
Shigellosis	19	5.87	18	0.7	3
Spotted Fever Rickettsiosis (RMSF)	3	0.93	148	5.76	17
Streptococcal disease, invasive, Group A	3	0.93	32	1.24	2
Streptococcal disease, invasive, Group B	1	0.31	0		0
Streptococcus pneumoniae, invasive disease	9	2.78	125	4.86	15
Transmissible Spongioform Enceph (TSE / CJD)	0		1	0.04	1
Tularemia (Francisella tularensis)	0		25	0.97	3
Typhoid Fever (Salmonella typhi)	0		2	0.08	0
Vancomycin-intermediate Staphylococcus aureus (VISA)	0		1	0.04	0
Varicella (Chickenpox)	57	17.62	384	14.94	15
Yersiniosis	0		2	0.08	0

^ Rate per 100,000 population

APPENDIX C: REPORTABLE DISEASES BY DEMOGRAPHIC CHARACTERISTIC

TABLE 4: REPORTABLE DISEASES BY GENDER, KANSAS, 2013

	Female		Male		Unknown
Disease	**Cases**	**Rate^**	**Cases**	**Rate^**	**Cases**
Amebiasis (Entamoeba histolytica)	1	0.07	3	0.21	0
Arboviral Disease	29	2	63	4.37	0
Botulism	0		1	0.07	0
Campylobacteriosis	134	9.23	194	13.45	0
Carbapenem-resistant Enterobacteriaceae	1	0.07	0		0
Clostridium perfringens food intoxication	9	0.62	6	0.42	0
Coccidioidomycosis	0		3	0.21	0
Cryptosporidiosis	59	4.06	41	2.84	0
Cyclosporiasis	3	0.21	1	0.07	0
Ehrlichiosis/Anaplasmosis	29	2	67	4.65	0
Giardiasis	43	2.96	60	4.16	1
HUS - Hemolytic Uremic Syndrome postdiarrheal	3	0.21	1	0.07	0
Haemophilus influenzae, invasive disease (Including Hib)	27	1.86	13	0.9	0
Harmful Algal Bloom Illness - Animal	0		1	0.07	0
Hepatitis A	8	0.55	3	0.21	0
Hepatitis B virus infection, chronic	52	3.58	51	3.54	1
Hepatitis B virus infection, perinatal	1	0.07	0		0
Hepatitis B, acute	4	0.28	6	0.42	0
Hepatitis C virus, past or present	542	37.33	983	68.17	3
Hepatitis C, acute	11	0.76	6	0.42	0
Influenza-associated pediatric mortality	1	0.07	0		0
Legionellosis	8	0.55	10	0.69	0
Listeriosis	0		3	0.21	0
Lyme Disease (Borrelia burgdorferi)	18	1.24	16	1.11	0
Malaria (Plasmodium spp.)	2	0.14	6	0.42	0
Meningitis, Bacterial Other	1	0.07	3	0.21	0
Meningococcal disease (Neisseria meningitidis)	1	0.07	2	0.14	0
Pertussis	240	16.53	165	11.44	0
Q Fever	1	0.07	3	0.21	0
Rabies, animal	0		0		60
Salmonellosis	231	15.91	192	13.32	1
Shiga toxin-producing Escherichia coli (STEC)	51	3.51	38	2.64	0
Shigellosis	22	1.52	18	1.25	0
Spotted Fever Rickettsiosis (RMSF)	49	3.37	119	8.25	0
Streptococcal disease, invasive, Group A	15	1.03	22	1.53	0
Streptococcal disease, invasive, Group B	1	0.07	0		0
Streptococcus pneumoniae, invasive disease	69	4.75	80	5.55	0
Transmissible Spongioform Enceph (TSE / CJD)	1	0.07	1	0.07	0
Tularemia (Francisella tularensis)	7	0.48	21	1.46	0
Typhoid Fever (Salmonella typhi)	1	0.07	1	0.07	0
Vancomycin-intermediate Staphylococcus aureus (VISA)	1	0.07	0		0
Varicella (Chickenpox)	203	13.98	253	17.55	0
Yersiniosis	1	0.07	1	0.07	0

^ Rate per 100,000 population

APPENDIX C: REPORTABLE DISEASES BY DEMOGRAPHIC CHARACTERISTIC

TABLE 5: REPORTABLE DISEASES BY URBAN/NON-URBAN* COUNTIES, KANSAS, 2013

	Urban		Non-Urban	
Disease	**Cases**	**Rate^**	**Cases**	**Rate^**
Amebiasis (Entamoeba histolytica)	3	0.19	1	0.08
Arboviral Disease	21	1.31	71	5.5
Botulism	1	0.06	0	
Campylobacteriosis	117	7.29	211	16.36
Carbapenem-resistant Enterobacteriaceae	0		1	0.08
Clostridium perfringens food intoxication	8	0.5	7	0.54
Coccidioidomycosis	3	0.19	0	
Cryptosporidiosis	43	2.68	57	4.42
Cyclosporiasis	2	0.12	2	0.16
Ehrlichiosis/Anaplasmosis	46	2.87	50	3.88
Giardiasis	63	3.93	41	3.18
HUS - Hemolytic Uremic Syndrome postdiarrheal	4	0.25	0	
Haemophilus influenzae, invasive disease (Including Hib)	21	1.31	19	1.47
Harmful Algal Bloom Illness - Animal	0		1	0.08
Hepatitis A	10	0.62	1	0.08
Hepatitis B virus infection, chronic	75	4.68	29	2.25
Hepatitis B virus infection, perinatal	1	0.06	0	
Hepatitis B, acute	6	0.37	4	0.31
Hepatitis C virus, past or present	884	55.11	643	49.85
Hepatitis C, acute	6	0.37	10	0.78
Influenza-associated pediatric mortality	1	0.06	0	
Legionellosis	14	0.87	4	0.31
Listeriosis	1	0.06	2	0.16
Lyme Disease (Borrelia burgdorferi)	21	1.31	13	1.01
Malaria (Plasmodium spp.)	6	0.37	2	0.16
Meningitis, Bacterial Other	3	0.19	1	0.08
Meningococcal disease (Neisseria meningitidis)	2	0.12	1	0.08
Pertussis	293	18.27	112	8.68
Q Fever	0		4	0.31
Rabies, animal	5	0.31	55	4.26
Salmonellosis	174	10.85	250	19.38
Shiga toxin-producing Escherichia coli (STEC)	48	2.99	41	3.18
Shigellosis	19	1.18	21	1.63
Spotted Fever Rickettsiosis (RMSF)	61	3.8	107	8.3
Streptococcal disease, invasive, Group A	25	1.56	12	0.93
Streptococcal disease, invasive, Group B	1	0.06	0	
Streptococcus pneumoniae, invasive disease	83	5.17	66	5.12
Transmissible Spongioform Enceph (TSE / CJD)	0		2	0.16
Tularemia (Francisella tularensis)	9	0.56	19	1.47
Typhoid Fever (Salmonella typhi)	2	0.12	0	
Vancomycin-intermediate Staphylococcus aureus (VISA)	1	0.06	0	
Varicella (Chickenpox)	196	12.22	260	20.16
Yersiniosis	1	0.06	1	0.08

^ Rate per 100,000 population

* Urban counties are defined as having a population density of greater than 150 people per square mile. Kansas' six urban counties account for more than half of the state population: Johnson, Sedgwick, Shawnee, Douglas, and Leavenworth

^ Rate per 100,000 population

* Urban counties are defined as having a population density of greater than 150 people per square mile. Kansas' six urban counties account for more than half of the state population: Johnson, Sedgwick, Shawnee, Douglas, and Leavenworth

APPENDIX D: REPORTABLE DISEASE CASES BY YEAR, KANSAS, 2004-2013

Disease	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Amebiasis (Entamoeba histolytica)	0	7	4	3	4	3	1	2	5	4
Anthrax*	0	0	0	0	0	0	0§	0	0	0
Arboviral Disease										
Saint Louis Encephalitis	1§	0	0	0	0	0	0	0§	0	0
Western Equine Encephalitis	0§	0	0	0	0	0	0	0§	0	0
West Nile Virus*	9§	9	12	5	5	3	5	1§	57	92
Botulism										
Foodborne	0	0	0	0	0	0	0	0§	0	0
Infant	1	0	0	0	0	1	0	1§	0	1
Other	0	0	0	0	0	0	0	0§	1	0
Brucellosis*	1	1	3	0	0	1	2§	0	1	0
Campylobacteriosis*	348	335	316	416	399	362	352	300	292	328
Cholera	0	0	0	0	0	0	0	1	0	0
Cryptosporidiosis*	31	40	82	144	84	104	106	42§	122§	100
Cyclosporiasis*	0	0	0	0	0	0	0§	0	0	4
Diphtheria	0	0	0	0	0	0	0§	0	0	0
Ehrlichiosis/Anaplasmosis*	1	0	0	1	0§	7	4	7	49	0
Giardiasis*	221	214	198	184	162	161	208	138§	133	104
*Haemophilus influenzae**										
Invasive Disease	8	18	20	12	20	14	24	23	32	40
Serotype B Meningitis	0	0	1	0	0	0	0	0	0	0
Hansen's Disease (Leprosy)	0	0	0	0	0	0	0	0	0	0
Hantavirus Pulmonary Syndrome	1	1	0	0	1	0	1§	0	0	0
Hemolytic-uremic Syndrome*	2	2	1	0	3	1	1	3	7	4
Hepatitis A	22	16	27	11	15	10	14	4§	15§	11
Hepatitis B, acute	18	32	10	9	9	6	11	15§	9§	10
Hepatitis B, chronic									8§	104
Hepatitis C, acute	0	3	0	0§	1	1	2	7§	16§	17
Influenza-associated Pediatric Mortality	0	0	2	1	0	2	0	0	1	1
Legionellosis	6	4§	10	10	2	7	12	14	16	18
Listeriosis	0	7	4	4	6	1	1	14	7	3
Lyme Disease*	3	3	4	7	16§	18	7	11§	19	34
Malaria	9	7	8	4	9	8	13§	10	7	8

* 2012 and 2013 totals include both confirmed and probable cases
† Not reportable during this year
§ Case definition altered during this year

APPENDIX D: REPORTABLE DISEASE CASES BY YEAR, KANSAS, 2004-2013

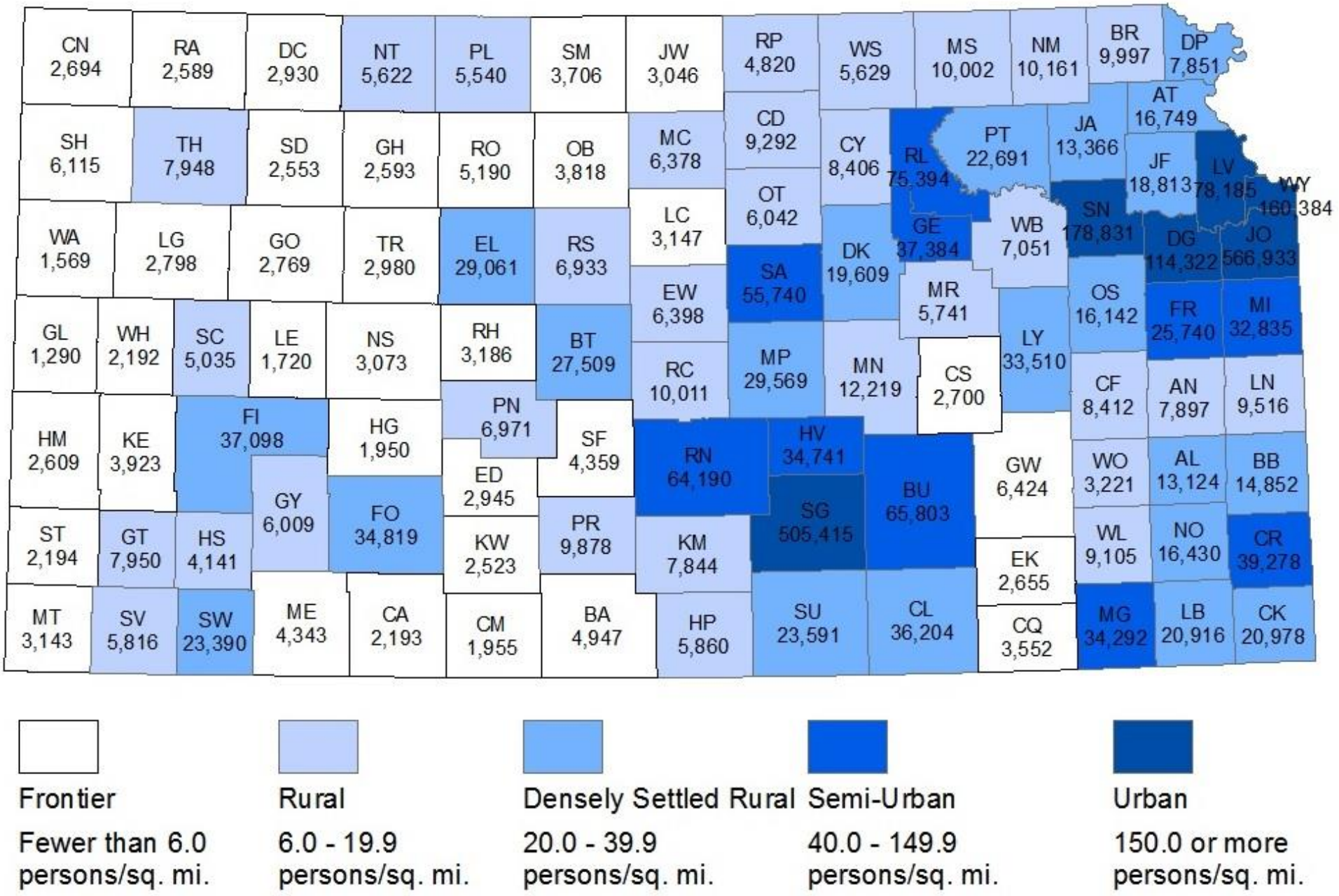
Disease	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Measles	0	0	1	0§	0	0	0§	7§	5	0
Meningitis, non-HiB, non-Neisseria	8	12	2	4	3	0	7	9	7	4
Meningococcal Disease*	14	11§	5	10	8	13	8§	5	6	3
Mumps*	4	0	207	7	2	4	4§	4	4§	0
Pertussis*	98	239	141	39	57	160	75§	52	887	405
Plague*	0	0	0	0	0	0	0	0	0	0
Poliomyelitis	0	0	0	0	0	0	0§	0	0	0
Psittacosis*	0	0	0	0	0	0	0§	0	0	0
Q Fever, Acute*	0	0	1	2	1	1§	0	0	2	3
Rabies										
Animal	99	80	83	111	68	78	58	31	56	60
Human	0	0	0	0	0	0	0	0	0	0
Rubella										
Congenital	0	0	0	0§	0	0	0§	0	0	0
Non-congenital	0	0	1	0§	0	0	0§	0	0	0
Salmonellosis*	394	369§	369	402	467	398	436	463	489§	424
Severe Acute Respiratory Syndrome*	0	0	0	0	0	0	0	0	0	0
Shiga Toxin-producing Escherichia coli*	48	49§	25	52	52	54	77	108	97	89
Shigellosis*	81	272§	138	26	67	214	275	67	129§	40
Smallpox	0	0	0	0	0	0	0	0	0	0
Spotted Fever Rickettsiosis*	0	4	1	1	0§	1	2§	0	141	168
Streptococcal Disease, Group A	40	40	53	32	41	39	20	32	42	37
Streptococcus pneumoniae, invasive	†	†	69	89§	79	52	125§	124	136	149
Tetanus*	0	0	0	1	0	0	0§	0	0	0
Toxic Shock Syndrome*	0	1	2	0	0	1	0	0§	0	0
Transmissible Spongioform Encephalopathy	†	†	†	2	4	2	2	5	1	2
Trichinellosis	0	0	0	0	0	0	0	0	0	0
Tularemia*	9	5	7	4	2	4	7	5	22	28
Typhoid Fever	1	1	1	1	3	0	1	4	1	2
Varicella*	259	478	372	586	481	252	166§	108	395	456
Viral Hemorrhagic Fever	0	0	0	0	0	0	0	0§	0	0
Yellow Fever*	0	0	0	0	0	0	0	0	0	0

* 2012 and 2013 totals include both confirmed and probable cases
† Not reportable during this year
§ Case definition altered during this year

APPENDIX E: REPORTABLE DISEASES WITH NO REPORTED CASES, KANSAS, 2013

Disease	Year of last reported case
Amebiasis	2012
Anthrax	1972
Botulism	2012
Brucellosis	2012
Cholera	2011
Diphtheria	1964
Hansen's Disease (Leprosy)	1999
Hantavirus Pulmonary Syndrome	2012
Measles	2012
Meningococcal Disease	2012
Mumps	2012
Plague	*Unknown*
Poliomyelitis	1967
Psittacosis	1992
Rabies, Human	1968
Rubella	2006
Severe Acute Respiratory Syndrome	*No cases reported*
Smallpox	1949
Tetanus	2007
Toxic Shock Syndrome	2009
Trichinosis	1999
Typhoid Fever	2012
Viral Hemorrhagic Fever	*Unknown*
Yellow Fever	*Unknown*

APPENDIX F: KANSAS COUNTY POPULATIONS AND POPULATION DENSITY PEER GROUPS*



* Population density groups are based on 2010 census data. County populations listed are 2013 estimates.

APPENDIX G: REPORTABLE DISEASES IN KANSAS FOR HEALTH CARE PROVIDERS, HOSPITALS, AND LABORATORIES

(K.S.A. 65-118, 65-(K.S.A. 65-118, 65-128, 65-6001 - 65-6007, K.A.R. 28-1-2, 28-1-4, and 28-1-18. Changes effective as of 9/29/2014)

☎ - Indicates that a telephone report is required by law within four hours of *suspect* or *confirmed* cases to KDHE toll-free at 877-427-7317

ⓘ - Indicates that an isolates must be sent to: Division of Health and Environmental Laboratories
6810 SE Dwight Street, Topeka, KS 66620
For Isolate Questions call: (785) 296-1633

Acquired Immune Deficiency Syndrome (AIDS)
Amebiasis
Anthrax ☎
Arboviral disease (including West Nile virus, Western Equine encephalitis (WEE) and St. Louis encephalitis (SLE)) - indicate virus whenever possible
Botulism ☎
Brucellosis
Campylobacter infections
Chancroid
Chlamydia trachomatis genital infection
Cholera ☎
Cryptosporidiosis
Cyclospora infection
Diphtheria
Ehrlichiosis
Escherichia coli O157:H7 (and other shiga-toxin producing E. coli, also known as STEC) ⓘ
Giardiasis
Gonorrhea
Haemophilus influenza, invasive disease
Hantavirus Pulmonary Syndrome
Hemolytic uremic syndrome, postdiarrheal
Hepatitis, viral (acute and chronic)
Hepatitis B during pregnancy
Human Immunodeficiency Virus (HIV) (includes Viral Load Tests)
Influenza deaths in children <18 years of age
Legionellosis
Leprosy (Hansen disease)
Listeriosis
Lyme disease
Malaria
Measles (rubeola) ☎
Meningitis, bacterial ☎
Meningococcemia ⓘ☎
Mumps ☎
Pertussis (whooping cough) ☎
Plague *(Yersinia pestis)*☎
Poliomyelitis ☎
Psittacosis
Q Fever *(Coxiella burnetii)* ☎
Rabies, human and animal ☎
Rocky Mountain Spotted Fever
Rubella, including congenital rubella syndrome ☎
Salmonellosis, including typhoid fever ⓘ
Severe Acute Respiratory Syndrome (SARS) ⓘ☎
Shigellosis ⓘ
Smallpox ☎
Streptococcal invasive, drug-resistant disease from Group A *Streptococcus* or *Streptococcus pneumoniae* ⓘ
Syphilis, including congenital syphilis
Tetanus
Toxic shock syndrome, streptococcal and staphylococcal
Transmissible Spongioform Encephalopathy (TSE) or prion disease (includes CJD)
Trichinosis
Tuberculosis, active disease ⓘ☎
Tuberculosis, latent infection
Tularemia
Varicella (chickenpox)
Viral hemorrhagic fever ☎
Yellow fever

In addition, laboratories must report:

- Viral load results of reportable diseases
- ALL blood lead levels, as of 12/2002 (KCLPPP/ABLES)
- CD4+ T-lymphocyte count < 500/ µl or CD4+ T-lymphocytes <29% of total lymphocytes

Outbreaks, unusual occurrence of any disease, exotic or newly recognized diseases, and suspect acts of terrorism should be reported within 4 hours by telephone to the Epidemiology Hotline: 877-427-7317

Mail or fax reports to your local health department and/or to:
KDHE Bureau of Epidemiology and Public Health Informatics , 1000 SW Jackson, Suite 075, Topeka, KS 66612-1274
Fax: 877-427-7318 (toll-free)

APPENDIX H: REPORTABLE DISEASE OUTBREAKS INVESTIGATED BY CATEGORY, KANSAS, 2013

Category	Number of Outbreaks Investigated
Foodborne	15
Norovirus	8
Other Enteric (Not Norovirus, Foodborne, or Waterborne)	5
Vaccine-Preventable	16
Respiratory, Including Influenza	1
Non-Reportable	2
Unknown	5

Visit http://www.kdheks.gov/epi/outbreaks.htm to view published outbreak investigation reports.